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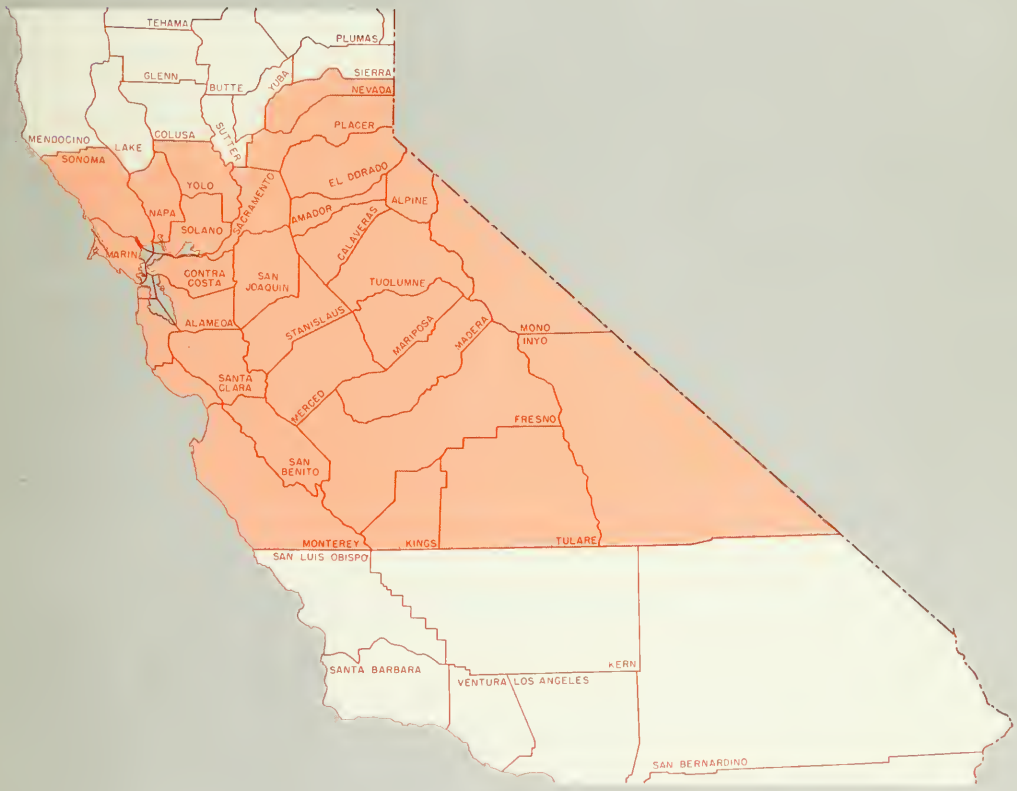
# Sand and Gravel In California

## Part B -- Central California




California Division of Mines and Geology
Bulletin 180

# SAND AND GRAVEL IN CALIFORNIA

## AN INVENTORY OF DEPOSITS

## *Part B -- Central California*

By HAROLD B. GOLDMAN, Geologist
California Division of Mines and Geology

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CALIFORNIA DIVISION OF MINES AND GEOLOGY
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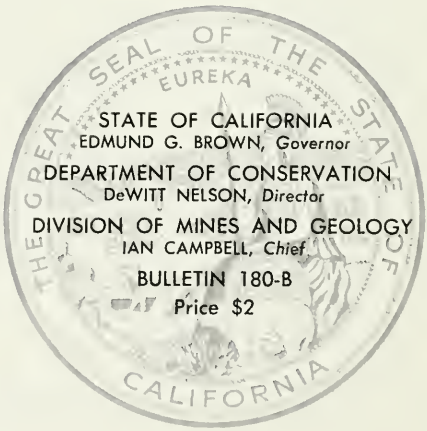


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## ABSTRACT

A reconnaissance field investigation of sand and gravel deposits in 31 counties in central California was conducted from 1961-1962. Deposits that were worked commercially and undeveloped deposits of potential economic interest were examined. Fixed plants were visited, pits sampled, and gravel examined in the laboratory.

Stream deposits, dredge and hydraulic tailings, beach and dune sands, fluvial-glacial deposits, and old geologic formations including sandstone and conglomerate are the principal sources of sand and gravel in central California. The bulk of sand and gravel occurs in the stream bed, floodplain, terraces and alluvial fans of the major streams. Dredge tailings and conglomeratic formations are minor but significant sources.

In 1961, approximately 44 million tons of sand and gravel valued at about 52 million dollars was produced from the central California counties covered in this report. Commercial operations are located close to population centers; those which produce from stream deposits are located on portions of the stream where a proper blend of material can be obtained. Plants have capacities ranging from 50-1000 tons per hour and produce concrete or bituminous aggregate and road base. Data on the individual deposits, including laboratory test data obtained from the California Division of Highways, are presented in a tabulation. The locations and extent of the deposits are shown on an accompanying map.

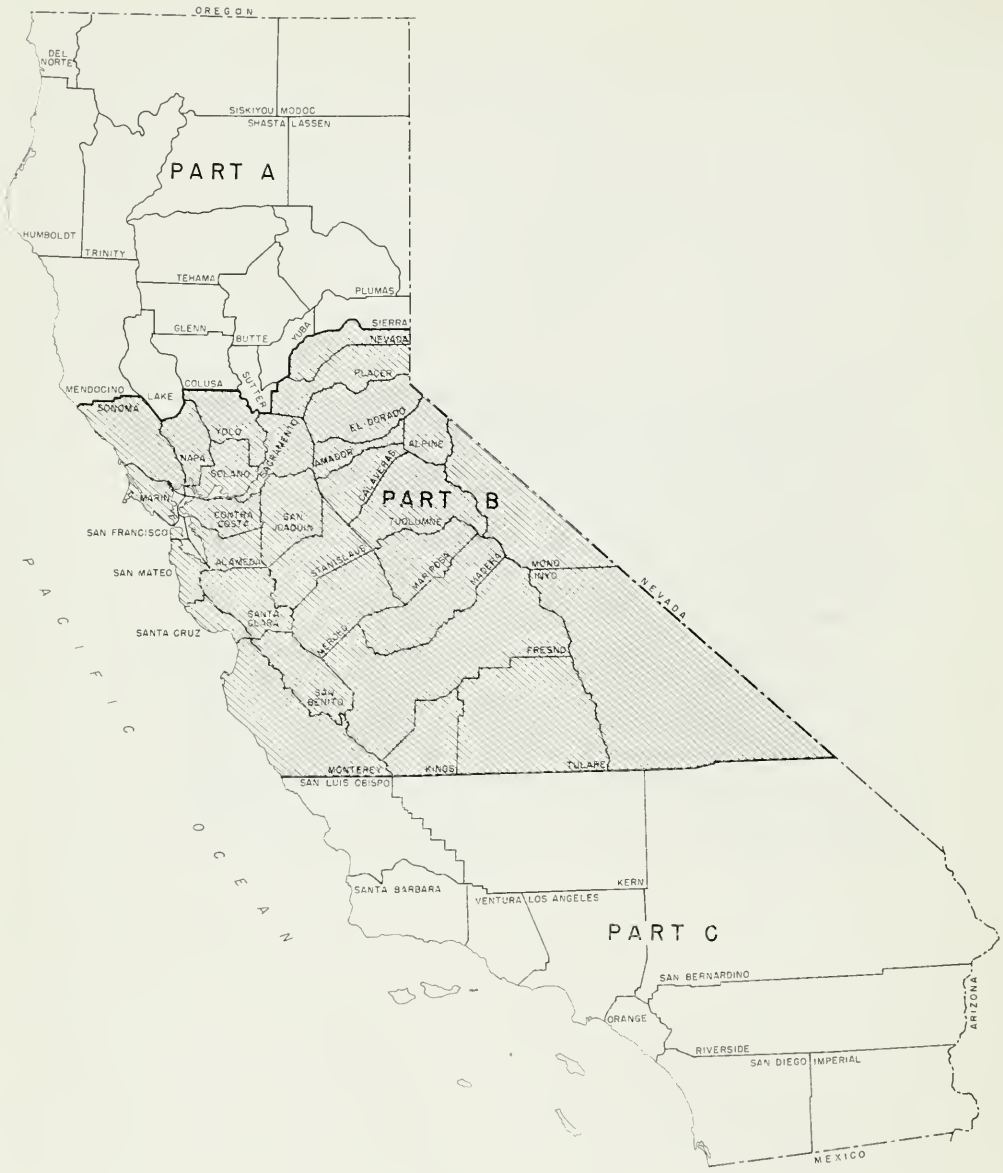


*Figure 1.* Map of California showing area covered in this report (shaded, labeled Part B) and area covered in Bulletin 180 Part A. Part C is in preparation.

# SAND AND GRAVEL IN CALIFORNIA

## INVENTORY OF DEPOSITS

### PART B—CENTRAL CALIFORNIA

By Harold B. Goldman

#### INTRODUCTION

This report is the second of a three-part bulletin on the occurrence of the major sand and gravel deposits in California. Part B includes the results of field and laboratory investigations of sand and gravel in an area in central California, including 31 central counties (Alameda, Alpine, Amador, Calaveras, Contra Costa, El Dorado, Fresno, Inyo, Kings, Madera, Marin, Mariposa, Merced, Mono, Monterey, Napa, Nevada, Placer, Sacramento, San Benito, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma, Stanislaus, Tulare, Tuolumne, Yolo). The 17 northern counties (Butte, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Plumas, Shasta, Sierra, Siskiyou, Sutter, Tehama, Trinity and Yuba), were discussed in Part A of this bulletin (180). The area covered in Part B as well as that covered in Part A are shown on figure 1.

*Purpose.* The purpose of this investigation was to obtain the basic information necessary to a statewide inventory of sand and gravel deposits, including the location and extent, geology, and status of commercial development of deposits.

*Scope of Investigations.* Field investigations of a reconnaissance type were conducted from June 1961 to July 1962. The location and extent of the deposits were plotted in the field on U.S. Geological Survey topographic maps scale 1:62,500 or 1:24,000. Field determinations of the configuration of the deposit were checked in the office with available U.S. Department of Agriculture soils maps, geologic maps, and aerial photographs. Samples of representative materials were taken in the field and later petrographic examinations made in the Division of Mines and Geology's aggregate laboratory.

All deposits that were being or had been worked commercially, and undeveloped deposits which may be of commercial significance in the near future were visited. Where commercial production was obtained from an extensive geologic formation such as a conglomerate, only the developed portion of the deposit was delineated. Small deposits (under 50,000 cubic yards), and major deposits located farther than 50 miles from a marketing area were excluded.

The fixed commercial plants were visited, operators interviewed, and their pits examined. Portable plants that were in operation at the time of this investigation are noted in the tabulation.

The results of standard acceptance tests on materials from commercial operators were obtained from the files of the Materials and Research Laboratory of the California Division of Highways. We wish to acknowledge the cooperation of the personnel of the Division of Highways in making their data available.

#### GEOLOGY OF DEPOSITS IN CENTRAL CALIFORNIA

Stream deposits, dredge and hydraulic mine tailings, beach and dune deposits, fluvial-glacial deposits and older geologic formations have all yielded commercial sand and gravel in central California. Approximately 75 percent of the sand and gravel being mined occurs as stream deposits.

##### Stream Deposits

Most of California's aggregate production is obtained from sand and gravel in stream deposits. California's rugged mountains are drained by streams with steep gradients. In flood stage these streams transport huge volumes of sand and gravel that are deposited in channel, floodplain, terrace, and alluvial fan deposits.

*Stream Channel Deposits.* Stream channel deposits consist of sand and gravel deposited in stream beds and as bars along present stream courses. Most channel deposits are exploited. The reason they are so commonly used is that so many California streams are dry for much of the year, when their channel deposits are accessible and easily mined. Materials in these deposits are desirable as aggregate for many reasons. The natural abrasive action of stream transport has ground up and removed most of the soft, weak rocks and concentrated the harder and firmer particles. The particles have undergone some degree of rounding, and are sub-to-well rounded, a physical attribute that makes them desirable for use in concrete. Most channel deposits are replenished by seasonal floods except in portions of the streams downstream from dams. Overburden is rarely present, but high waters may bring in silt, clay, and wood debris to cover parts of some channel deposits. The maximum size of gravel gradually decreases downstream in the streams with long reaches, and commercial production is concentrated in the deposits where a proper blend of sand and gravel can be obtained. Fortunately, the favorable portions of

*Photo 1.* The principal saurces af sand and gravel in central California are the streom beds, flaadplains, terraces, and alluviol fans of the majar modern streams (upper left). Significant production is alsa obtained from older geologic formatians, such as conglomerate (center left), marine sandstone (lawer left), and ancient gold-bearing stream channel deposits in the Sierran foothills (below, right).

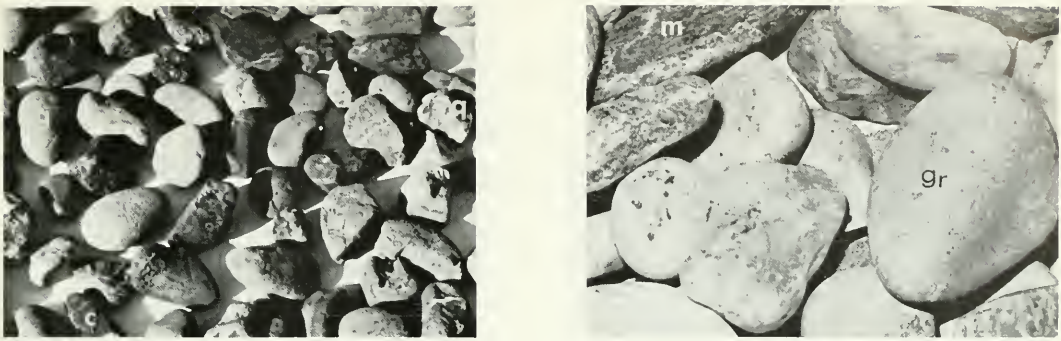


*Photo 2.* The bulk of central California's sand and gravel is obtained from deposits in two distinct geomorphic provinces—Coast Ranges and Sierra Nevada. The rock types in these deposits reflect the source rocks in the drainage basins: a typical Coast Ranges assemblage (left) contains sub-angular to subrounded graywacke (g), chert (c), and vein quartz (q); a typical Sierran assemblage (right) contains well-rounded quartzitic metamorphic rocks (m), and granitic rock types (gr).

many streams are in flat-lying areas near population centers, as for example, the San Joaquin River near Fresno, the American River near Sacramento, and Coyote Creek near San Jose.

*Floodplain Deposits.* True floodplain deposits consist of material deposited on plains bordering streams by periodic overflow of the streams from their channels. The sediments deposited are normally composed of silt and sand grains. However, these fine materials may mantle usable deposits of sand and gravel, particularly in areas where, in the geologic past, the streams were more competent and transported greater volumes of coarser material. The sand and gravel in these older deeper floodplain deposits is similar to that in channel deposits, and is suitable for use after overlying floodplain silt layers are removed. Floodplain deposits are best exemplified in the eastern portion of the San Joaquin Valley: along the Kings, Kaweah, Merced, San Joaquin, Stanislaus, Tuolumne, and Tule Rivers; and in the San Jose area along Coyote, Guadalupe, and Calaveras Creeks.

*Terrace Deposits.* Stream terrace deposits are bench-like deposits of sand and gravel which border a stream but lie above the level of the present floodplain.

These deposits are remnants of older floodplains through which the stream has cut. Terrace deposits, because they are above the stream level, may be more desirable than stream channel deposits if water tables are shallow and abundant ground water makes stream channel operations difficult. However, there is no possibility of replenishment. The materials in these deposits have the general properties of stream channel materials, but weathering processes may have diminished the quality of some of its constituents by converting certain minerals to clay. The terraces along the Stanislaus River in the San Joaquin Valley have been a source of production for many years.

*Alluvial Fans.* An alluvial fan is a gently sloping fan-shaped mass of loose rock material deposited at the mouth of a canyon where a stream leaves the mountains and enters an adjacent valley or plain. The abrupt flattening of gradient causes deposition of the bulk of the bed load in a crudely stratified mass. The cobbles and boulders are deposited at the apex of the fan and the average particle size decreases toward the sides and base of the fan. Fan deposits ordinarily contain lenticular beds or tongues of poorly sorted sand and gravel interbedded with varying proportions of silt and clay resulting from the frequent shifting of the stream channel. The particles are sub-angular to angular in the fans built by streams with small drainage areas. The particles in large fans, covering several square miles, are generally sub-angular to sub-rounded. Suitable aggregate is obtained from alluvial fans which are free from thick clay lenses.

One of the major sources of aggregate for the San Francisco Bay area is the alluvial fan of Alameda Creek, near Niles, in Alameda County. Another major source

*Photo 3.* Tailings from hydraulic mines and dredges are excellent sources of sand and gravel particularly where a proper blend of fine material with the pebbles and cobbles may be obtained (above, left). Tailings from old hydraulic mines in the Mother Lode belt contain high percentages of quartz (above, right).

of aggregate for this area is located in the Livermore Valley and is composed of coalescing alluvial fans built by Arroyo Del Valle and Arroyo Del Mocho Creeks, and other tributaries that have transported material into a structural basin.

Alluvial fans on the west side of the San Joaquin Valley and the eastern slope of the Sierra Nevada are also potential sources.

#### Dredge Tailings and Hydraulic Mining Debris

As a result of bucket dredge operations for gold, huge furrowed ridges of gravel have been accumulated as tailings along many of the streams in the Sierra Nevada foothills. Ordinarily, the dredging operations resulted in segregated masses of fine gravel and sand overlain by masses of cobbles and boulders, requiring that considerable material be processed by aggregate producers to obtain the desired grading of sand and gravel. Although the cobbles and boulders are usually crushed for use as road base, tailings which are not weathered are as suitable for concrete aggregate as the undisturbed portions of that stream's deposit.

Sand and gravel have been concentrated in streams draining areas where debris has been swept in by past hydraulic mining. Ordinarily the mining debris contains hard, rounded, resistant quartz gravel which has withstood cycles of erosion and transport. About half the gravel in the Bear River near Colfax, in Placer County, is white quartz derived from the hydraulic mines upstream at Dutch Flat. The gravel originally occurred in Tertiary auriferous channels which, in themselves, are a source of sand and gravel (see under geologic formations below).

*Glacial and Fluvial-Glacial Deposits.* Glacial deposits, which are restricted to high elevations, are absent in most portions of central California. Glacial deposits, such as moraines, which have been transported solely by glacial ice, contain materials that have not been subjected to the abrasive action of streams. Most of these deposits contain materials of diverse size, shape and quality, ranging from rock flour to erratic boulders, and are usable only after expensive processing.

Fluvial-glacial deposits are made up of glacial materials that have been subjected to stream action. These deposits exhibit a better degree of sorting and contain less clay than glacial deposits, and are of high enough quality to yield satisfactory aggregate materials comparable to true stream sand and gravel. The fluvial-glacial deposit at the eastern edge of Donner Lake near Truckee in Nevada County is of this type.

*Older Geologic Formations.* Older geologic formations, particularly those containing partially consolidated beds of sandstone and conglomerate, afford usable sources of sand and gravel when post-depositional weathering has not been too complete. Ordinarily, these formations have been subjected to long periods of weathering and are too well cemented or contain too much clayey material to be processed economically at the present time. Accessibility, depth of overburden, caliche coatings, and

*Photo 4.* The common method of excavating sand and gravel in central California is by means of a dragline usually working below water in the stream bed (lower right). Other methods, such as suction dredge (above, left) and drag scraper (lower left) are used in sand deposits. A fluvio-glacial deposit in the Sierras is excavated by a bucket line dredge from which the sand and gravel are pumped to the plant (above, right).

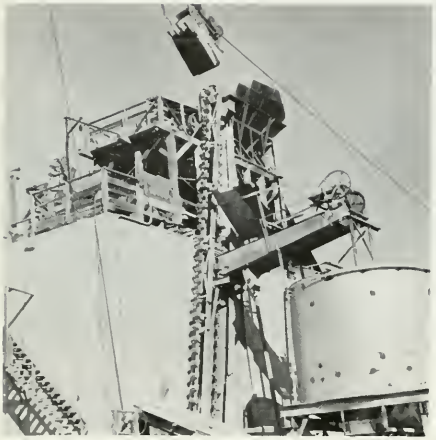

*Photo 5.* The methods of processing sand and gravel range from simple screening operations (above, left) to complex classification techniques using hydraulic sizing tanks, screw-type classifiers, and cyclones (above, right).

cemented layers also present problems. However, considerable production is obtained from the Victor Formation of Pleistocene age near Sacramento, the Santa Margarita Formation of Miocene age near Santa Cruz, and the Santa Clara Formation of Pliocene age near San Jose.

The Tertiary auriferous channel deposits in the Sierra Nevada also are potential sources of sand and gravel. The reader is directed to Professional Paper 73, by Waldemar Lindgren, published by the U.S. Geological Survey, in which the Tertiary channels are described and outlined. Division of Mines Bulletin 135, *Placer Mining for Gold in California*, contains a map showing the general distribution of the channels. Both books are out of print. Essentially the same problems would be encountered in attempting to process these channel deposits, as with an old conglomerate.

Modern beneficiating techniques can be used successfully to obtain high quality aggregate from these older formations.

An article by the author discussing the use of older geologic formations as a source of concrete aggregate and beneficiation techniques, was published in the November 1962 issue of *Rock Products* magazine.

*Beach and Dune Deposits.* Sand and gravel formed by the winnowing action of currents and waves on a beach make excellent aggregate. Particles are generally well-rounded, hard, and firm. The sands are commonly composed predominantly of resistant quartz and feldspar. Most beach deposits, however, are thin, lack proper size gradation, or are too inaccessible to be utilized for aggregate.

Beach and near-shore dune sands in the Monterey Bay area are significant sources of specialty sand. The dunes are stabilized and contain well-sorted sand particles composed essentialy of quartz and feldspar.

## ECONOMIC DEVELOPMENT

*Production.* In 1961, approximately 44 million tons of sand and gravel valued at about 52 million dollars was produced from deposits in the counties covered by this report. This represents approximately 40 percent of the total production of sand and gravel in California for that year.

The present market for sand and gravel in central California is primarily in residential, commercial, and industrial construction. About 90 percent of the sand and gravel is processed in fixed plants and sold commercially. The remainder is produced by contractors with portable plants for use by city, county, state or federal agencies on public works projects.

Nearly all production is obtained from well-established aggregate-producing areas located near population centers. Few new deposits are being developed annually, and there is small possibility of locating a large, as yet unknown, source close to a marketing area.

The press of urban growth is being felt by producers in central California, and expansion of existing pits becomes increasingly difficult in view of tightening zoning

restrictions. In some counties, it is virtually impossible to obtain a permit to open a new pit. Future production will come from existing sources, leading to depletion of a number of deposits within the next 20 years. It may then become necessary to import sand and gravel from deposits which are beyond the present economic limit of hauling (about 50 miles) in California.

*Mining Methods.* Various methods of excavating sand and gravel are used in central California. The most common method is to use a dragline, working either wet in the stream bed below the water table, or in dry pits. In dry deposits, a tractor shovel ("front-end loader" or "shovel-dozer") is ordinarily used to excavate and to haul to the plant.

Slackline cableways and dragscrapers are used in certain areas to excavate and convey to the plant. At a few operations, suction dredges are used to excavate and pump the sand and gravel to the plant.

End dump trucks, scrapers, and bottom dump trailers are used to haul material from the pit to the plant. Some operators use bulldozers to excavate and push the material to the plant.

The method of excavation for each commercial operation is described in the tabulation of deposits.

*Plant Processing.* Commercial operations are located on portions of deposits where the proper blend of sizes of sand and gravel can be obtained in order to produce a variety of products. Non-commercial production by highway contractors generally is obtained from portions of deposits where there is an abundance of plus 1½ inch gravel to provide crushed materials for use as road base or bituminous aggregate. Ideally, a commercial deposit would contain about 60 percent gravel to 40 percent sand (minus ¼ inch); enough plus 1½ inch gravel to crush for use as road base or bituminous aggregate; and sand in the correct sizes and proportions for use in concrete. Few deposits meet these requirements, and plants are designed to cope with natural deficiences.

The plants in central California range in capacity from 50 to 1000 tons per hour; the average plant has a capacity of 200 to 300 tons per hour. These are medium-size plants. Larger plants with capacities up to 1000 tons per hour furnish the aggregate for the San Francisco Bay area.

Most plants are departmentalized to produce different products. There is usually a "dry" side, where pit run material is screened and crushed for use as road base (or in some instances as bituminous aggregate), and a "wet" side where sand and gravel is washed and screened for use as concrete aggregate. Various stages of crushing are used to reduce the gravel fraction to the necessary sizes. Ordinarily a jaw crusher is used for primary reduction, particularly where cobbles and boulders, larger than 3 inches, are present. Gyratory and rolls crushers further reduce the gravel to minus 1 inch, and minus ¾ inch. Rod mills are used to manufacture sand from ¼ inch-⅜ inch "pea" gravel to supplement natural sand that is deficient in fine sizes.

The sand fraction ordinarily is washed and classified in spiral classifiers (sand screws). Plants processing sand deficient in fine sizes usually employ wet cyclone-type separators to recover fine sand which may be present in the overflow from a classifier. In a number of plants hydraulic settling tanks are used to separate the sand into various sizes. The desired blend of sand sizes is drawn off through gates in the bottom of the tank and dewatered in spiral classifiers.

Plants processing clayey material use revolving scrubbers to clean the pit run material before further processing.

Standard screens which are mechanically vibrated, separate the gravel into the necessary sizes. Trommel screens are used in some plants.

Almost all the commercial plants produce concrete aggregate; about a fourth also produce bituminous aggregate; all are capable of producing road base.

## PRESENTATION OF DATA

Data on the individual deposits are presented in the following tabulation and include name and location and geologic description of deposit, fixed plant description, and laboratory test data. The tabulation is keyed to the accompanying map (plate 1) by being arranged alphabetically according to the name of the deposit, which in most instances is the related stream. Where the deposit is in a formation not related to a modern stream drainage, the formation name serves as the deposit name. An alphabetical cross index of operator-to-deposit is included at the end of the tabulation. Also included is a comprehensive list of sand and gravel producers in central California for 1961, arranged by county. This latter list contains, in addition to the operators described in this report, the names and addresses of producers who intermittently operate portable plants at various locations, or who sell pit run unprocessed material.

The locations and extent of the deposits which were visited and the fixed plants are shown on plate 1. The deposits were originally plotted on 1:24,000 or 1:62,500 topographic maps and reduced to the scale of the accompanying map. To show the deposits on this reduced scale, it was necessary to exaggerate the widths of the deposits. The dimensions are given in the tabulation under the column headed "Type and Extent".

Only the portions of old geologic formations that have been commercially developed have been shown on the map. For the areal distribution of these formations, the reader is referred to the Geologic Map of California and to geologic reports referred to in Division of Mines and Geology Special Reports 52 and 52-A, *Index to Geologic Maps of California.*

The data for the classification of rock types were obtained by petrographic examination of approximately 200 pebbles in the ¾-1½ inch range (a size most useful for petrographic study and one of commercial interest) from each deposit. In practice, the 200 pebble sample amounts to all the ¾-1½ inch pebbles in a pit run sample of about 100 pounds.

It has been found in other studies (such as published in Division of Mines and Geology Special Report 70,

*Sand and Gravel Resources of the Kern River near Bakersfield*), that for the ordinary stream deposit, examination of the size sample indicated above is sufficient to establish the essential physical and chemical character of the materials in the deposit. Attention can be focused upon those rocks or minerals that might have a detrimental effect on the concrete-making qualities of the aggregate in which they are included.

The rock type classifications which are followed by the letters "USBR" were obtained from unpublished reports made by Ira E. Klein for the U.S. Bureau of Reclamation. Three other petrographic analyses were obtained from the Division of Highways and are so indicated. We wish to acknowledge these agencies' cooperation in making their data available.

The laboratory test data were obtained from the files of the Material and Research Laboratory of the Division of Highways in Sacramento. In using these test results it should be borne in mind that these tests represent only the samples submitted and do not represent all the material in a given deposit. An attempt was made to use only test results obtained in the 5-year interval 1958-1962. When deposits were not tested recently, test results from pre-1958 were used, solely for the sake of completeness and as a guide for future use. The dates of testing are shown in the tabulation.

*Phata 6.* The large capacity plants in central California are located in the Livermore Valley, in Alameda County. *Phata courtesy Henry J. Kaiser Co.*

# TABULATION OF SAND AND GRAVEL DEPOSITS IN CENTRAL CALIFORNIA

# SAND AND GRAVEL IN CALIFORNIA

## INVENTORY OF DEPOSITS

### PART B—CENTRAL CALIFORNIA

| DEPOSITS | | | | UTILIZATION | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Fixed Plant Operations | | | | | Laboratory Test Data | | | | | | | | | | |
| | | | | | | | | | | Specific Gravity | | Absorption (percent) | | Abrasion (percent loss) | | Soundness (percent loss) | | | |
| Name and Location | Type and Extent | General Features | Rock Types (percent) | Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | | Sand | Gravel | Sand | Gravel | 100 rev. | 500 rev. | Sand | Gravel | Sand Equiv. | Organic Content |
| **Alameda Creek,** Alameda County, near Niles | Flat lying, alluvial cone deposit, triangular in plan, with apex at Niles Canyon. Gravelly portion of deposit, which is adjacent to present creek drainage, increases in width from about 1000′ (at Niles) to about 4,000′, approx. 2½ miles downstream. Sand and gravel excavated to depth of 125′. Some thin silt and clay interbeds present. | Overburden of silt, fine sand, and clay ranges from 3-40′ thick. In places, a clay layer up to 10′ thick constitutes the overburden. No replenishment of deposit. Sub-angular to sub-rounded gravel ranges up to 6″ maximum, but greatest percentage is minus 4″. Size of gravel varies with distance from head of fan (coarser near Niles Canyon). Deposit slightly deficient in fine sand. Water table is 60-125′ deep on west side of Irvington fault which trends northwest and intersects fan near Niles. Water table at 60′ on east side of fault. | Graywacke 69<br>Vein quartz . . 12<br>Chert . 9<br>Siltstone . 5<br>Greenstone 3<br>Schist . . 2<br>Granitic <1 | Henry J. Kaiser Co.<br>300 Lakeside Dr.<br>Oakland<br>SW¼ Sec. 21 (proj.), T. 4 S., R. 1 W., MDBM.<br>Approx. ½ mile south of Niles. | Excavate from pit 800′ x 400′ with Sauerman slackline cableway. Work below water table to 75-100′ depth. | Slackline dumps over 15′ x 15′ grizzly set at 6″. Plus 2″ crushed in primary jaw crusher; plus 1½″ reduced in a 4′ Symons cone crusher. Wash over double deck vibrating screens; sand dewatered in a Dorr duplex dual-flight drag. | 200 tons per hour | Concrete and bituminous sand and gravel | No. of Tests | 4 | 8 | 4 | 8 | 2 | 2 | 2 | 6 | 4 | 4 |
| | | | | | | | | | Range of Results | 2.56 to 2.66 | 2.64 to 2.68 | 0.9 to 2.1 | 1.5 to 2.4 | 5.0 6.6 | 25.2 28 4 | 6.6 5.1 | 6.1 to 15.8 | 81 to 89 | 1 |
| | | | | | | | | | Average 1956-61 | 2.61 | 2.66 | 1.6 | 1.7 | | | | 8.7 | 85 | Satis. |
| | | | | Niles Sand and Gravel Co., Inc.<br>P.O. Box 155, Niles<br>NW¼ Sec. 20 (proj.), T. 4 S., R. 1 W., MDBM.<br>About 1 mile west of Niles. | Excavate with scrapers (pushed by tractors), or load scrapers with dragline, from pit 750′ x 500′. Work to water table at about 125′. Haul about 1000′ to plant. | Stockpile and feed plant with dragline. Feed goes to 28′ trommel scrubber from which fines go to a settling tank and are dewatered in twin screw classifier. Plus 2½″ crushed in primary Pioneer jaw crusher; plus 1½″ crushed in 2 cone crushers. | About 450 tons per hour | Concrete and bituminous sand and gravel, road base | | | | | | | | | | | |
| | | | | Pacific Cement and Aggregates, Inc.<br>400 Alabama St.<br>San Francisco<br>SW¼ Sec. 20 (proj.), T. 4 S., R. 1 W., MDBM<br>Approx. 2 miles southwest of Niles. | Excavate from pit 500′ x 500′ with dragline. Work second pit 750′ x 500′, in 25′ benches to 100′ depths. Haul in bottom dump Terra-cobras about 1000′ to plant. | Feed goes to revolving scrubber, fines are flumed to two dewatering screws. Oversize crushed in jaw and roll crushers. Wash over standard vibrating screens. | 320 tons per hour | Concrete and bituminous sand and gravel, road base | No. of Tests | 10 | 10 | 10 | 10 | 7 | 7 | 4 | 8 | 10 | 10 |
| | | | | | | | | | Range of Results | 2.60 to 2.65 | 2.64 to 2.68 | 0.9 to 1.8 | 1.3 to 2.0 | 3.6 to 5.0 | 21.6 to 25.2 | 4.7 to 5.4 | 3.2 to 6.9 | 75 to 88 | 1 |
| | | | | | | | | | Average 1958-60 | 2.62 | 2.66 | 1.5 | 1.5 | 4.6 | 23.6 | 5.0 | 5.1 | 82 | Satis. |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Rhodes and Jamieson, Ltd. 333-23rd Ave., Oakland NE¼ Sec. 19 (proj.), T. 4 S., R. 1 W., MDBM. Approx. 2 miles west of Niles. | Excavate with dragline from open pit 500′ x 1000′. Work to water table at about 60′ depth. Load bottom dumps for haul of about 1000′ to plant. | Pit run goes to rotary scrubber from which sand goes to twin screw classifier. Plus 4″ scalped off and crushed in primary jaw; plus 1½″ crushed in two secondary cone crushers. Use standard vibrating screens. | 200 tons per hour | Concrete sand and gravel, screenings | No. of Tests | 10 | 10 | 10 | 10 | 6 | 7 | 4 | 10 | 10 | 10 |
| | | | | | | | | | Range of Results | 2.60 to 2.65 | 2.63 to 2.70 | 1.3 to 1.9 | 1.1 to 1.8 | 4.8 to 6.2 | 23.0 to 37.4 | 1.5 to 4.5 | 0.7 to 7.4 | 68 to 88 | 1 |
| | | | | | | | | | Average 1960-61 | 2.62 | 2.66 | 1.6 | 1.4 | 5.3 | 25.9 | 3.4 | 3.5 | 80 | Satis. |
| **American River,** Sacramento County, near Sacramento | Stream bed, floodplain, and terrace deposit extends from Folsom downstream, a distance of approx. 10 miles. Deposit ranges in width from 0.2 mile near the Dam, to about 1 mile near Sacramento. Depth of deposit varies from 12′ to 35′. (Deposit described in detail in Calif. Jour. Mines and Geology, vol. 51, no. 2). | No replenishment. No overburden on stream bars; 1-3′ on floodplain, up to 15′ on terraces. Maximum size gravel 10″ at Folsom diminishes downstream to 4″, near Sacramento. Stream bed becomes sandy near confluence with Sacramento River. Maximum size there is 3/16 inch. Rounded gravel. | Basic metaigneous37-43<br>Quartzitic metasediments.26-28<br>Vein quartz .1-13<br>Andesite 7-9<br>Hornfels 6-8<br>Amphibolite . . .3-5<br>Granitic .2-5<br>Dioritic gabbroic. . .2-5<br>(Data from USBR). | Arden Sand & Gravel Co. 977 Arden Way Sacramento NW¼ Sec. 4 (proj.), T. 8 N., R. 6 E., MDBM. About 9 miles east of Sacramento Civic Center. | Excavate from terrace with dragline to 35′ depths. Haul about 1¼ mile to plant. | Crush oversize in primary jaw, secondary and tertiary cone crushers. Wash in trommel; over standard vibrating screens; sand rake. | 250 tons per hour | Concrete and bituminous sand and gravel, road base | | | | | | | | | | | |
| | | | | Fair Oaks Gravel Co. 4000 Illinois Ave. Fair Oaks NW¼ Sec. 17 (proj.), T. 9 N., R. 7 E., MDBM. About 7 miles southwest of Folsom Dam. | Excavate from pit, which covers 20 acres, in terrace with power shovel to 30′ depth. Haul about ¾ mile to plant. | Crush oversize in primary jaw, secondary cone crushers. Wash in trommel; over standard vibrating screens; sand drag. | 60 tons per hour | Concrete sand and gravel | No. of tests | 7 | 1 | 6 | 1 | 1 | 1 | 2 | 1 | 3 | 2 |
| | | | | | | | | | Range of results | 2.59 to 2.65 | 2.76 | 2.0 to 4.3 | 0.8 | 4.0 | 21.0 | 7.2 3.4 | 1.4 | 84 97 97 | 1 |
| | | | | | | | | | Average 1959-60 | 2.61 | | 3.0 | | | | | | | Satis. |
| | | | | Hard Materials P.O. Box 709 Sacramento NW¼ Sec. 25, T. 9 N., R. 4 E., MDBM. In Sacramento. | Excavate from recent stream bed with suction dredge. Work to 30′ depth. | Wash and classify in hydroseparator and rake classifier. | 150 cubic yards per day | Plaster and stucco sand | | | | | | | | | | | |
| | | | | Pacific Cement and Aggregates, Inc. 400 Alabama St. San Francisco SW ¼ Sec. 18 (proj.), T. 9 N., R. 7 E., MDBM. About 8 miles southwest of Folsom Dam. | Excavate from stream bed, terrace, and dredge tailings with draglines. Haul in bottom dump trucks about ½ mile to plant. | Crush in 3 jaw and 3 gyratory crushers. Wash in trommel-scrubber; over standard vibrating screens; screws and sand rakes. | 375 cubic yards per hour | Concrete and bituminous sand and gravel, filter gravel, plaster sand, road base | No. of tests | 10 | 10 | 10 | 10 | 8 | 8 | 10 | 10 | 10 | 10 |
| | | | | | | | | | Range of results | 2.60 to 2.67 | 2.78 to 2.83 | 0.8 to 3.0 | 0.5 to 1.8 | 2.6 to 4.0 | 14.0 to 19.8 | 3.0 to 6.5 | 0.4 to 1.6 | 73 to 90 | 1 |
| | | | | | | | | | Average 1960-61 | 2.65 | 2.81 | 2.3 | 0.8 | 3.3 | 16.2 | 4.9 | 1.0 | 82 | Satis. |

| DEPOSITS | | | | UTILIZATION | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Fixed Plant Operations | | | | | Laboratory Test Data | | | | | | | | | | |
| | | | | | | | | | | Specific Gravity | | Absorption (percent) | | Abrasion (percent loss) | | Soundness (percent loss) | | | |
| Name and Location | Type and Extent | General Features | Rock Types (percent) | Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | | Sand | Gravel | Sand | Gravel | 100 rev. | 500 rev. | Sand | Gravel | Sand Equiv. | Organic Content |
| American River —Continued | | | | Robt. Powell Products, Inc. 24th and American River, Sacramento SE¼ Sec. 30, T. 9 N., R. 5 E., MDBM. In Sacramento. | Excavate from present stream bed with suction dredge to 18′ depth. | Screen, classify in settling tank. | 150 cubic yards per day | Mortar and plaster sand | No. of tests | 1 | | 1 | | | | | | 1 | 1 |
| | | | | | | | | | Range of results | 2.60 | | 2.0 | | | | | | 95 | 2 |
| | | | | | | | | | Average 1960 | | | | | | | | | | Satis. |
| | | | | Teichert Aggregates P.O. Box 928 Sacramento Del Paso plant NE¼ Sec. 12, T. 8 N., R. 5 E., MDBM. About 7 miles east of Sacramento Civic Center. | Excavate from stream bed with dragline to 14′ depth. Haul about 1 mile to plant. | Crush oversize in primary jaw, secondary and tertiary cone crushers. Wash in trommel; over standard vibrating screens; sand rake. | 200 tons per hour | Concrete and bituminous sand and gravel, road base | No. of tests | 10 | 10 | 9 | 13 | 7 | 7 | 6 | 12 | 9 | 9 |
| | | | | | | | | | Range of results | 2.56 to 2.72 | 2.77 to 2.88 | 1.5 to 2.1 | 0.4 to 0.8 | 2.8 to 4.2 | 14.4 to 20.6 | 2.2 to 6.9 | 0.2 to 1.6 | 80 to 95 | 1 |
| | | | | | | | | | Average 1956-61 | 2.63 | 2.80 | 1.7 | 0.6 | 3.5 | 16.6 | 3.6 | 1.0 | 87 | Satis. |
| **American River,** Sacramento County, near Sacramento | Ancestral floodplain deposit (portion of the Victor Formation) of the American River extends from Folsom to the southwest, a distance of approx. 15 miles. Deposit ranges in width from 1 mile near the Dam, to about 4 miles to the southwest. Depth ranges from 12′ in the east, to at least 45′, near east Sacramento. | No replenishment. Overburden ranges from 2 to 20′. Maximum size 8", diminishes to the west and south to 4" maximum near east Sacramento. (Deposit described in Calif. Jour. of Mines and Geology, vol. 51, no. 2.). | Basic metaigneous...36<br>Quartzitic metasediments...34<br>Amphibolite 7<br>Granitic....7<br>Andesite....4<br>Vein quartz....4<br>Hornfels....4<br>Dioritic-gabbroic 4<br>(Data from USBR) | Brighton Sand & Gravel Co. P.O. Box 7001 Perkins Branch Sacramento NW¼ Sec. 24, T. 8 N., R. 5 E., MDBM. About 6 miles southeast of Sacramento Civic Center. | Excavate from dry pit, which covers 45 acres, with dragline to 30′ depth. Haul about 1 mile to plant. | Crush oversize in primary jaw and cone, secondary roll (2) crushers. Wash in trommel; over standard vibrating screens; sand screw. | 300 tons per hour | Concrete and bituminous sand and gravel | No. of tests | 9 | 10 | 9 | 10 | 8 | 8 | 5 | 10 | 8 | 8 |
| | | | | | | | | | Range of results | 2.60 to 2.66 | 2.67 to 2.78 | 2.0 to 2.8 | 0.6 to 1.0 | 3.2 to 4.0 | 14.6 to 22.2 | 2.5 to 5.1 | 0.6 to 2.1 | 79 to 92 | 1 |
| | | | | | | | | | Average 1958-61 | 2.63 | 2.73 | 2.4 | 0.8 | 3.6 | 17.6 | 3.4 | 1.2 | 86 | Satis. |
| | | | | Granite Const. Co. P.O. Box 900 Watsonville SW¼ Sec. 14, T. 8 N., R. 5 E., MDBM. About 5 miles southwest of Sacramento Civic Center. | Excavate from dry pit, which covers 4 acres, with power shovel to 40′ depths. Haul about 1 mile to plant. | Crush in two cone crushers. Wash in trommel scrubber; over standard vibrating screens; sand screw. | 3000 cubic yards per day | Concrete and bituminous sand and gravel, road base | No. of tests | 4 | 7 | 5 | 7 | 3 | 3 | 4 | 5 | 4 | 5 |
| | | | | | | | | | Range of results | 2.56 to 2.64 | 2.70 to 2.79 | 2.0 to 4.1 | 0.4 to 0.8 | 3.0 to 2.8 3.0 | 16.2 to 14.8 15.8 | 3.0 to 6.9 | 0.6 to 1.1 | 87 to 94 | 1 |
| | | | | | | | | | Average 1956-59 | 2.62 | 2.73 | 2.6 | 0.6 | | | 4.7 | 0.9 | 91 | Satis. |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | McGillivray Const. Co. P.O. Box 873 Sacramento SE¼ Sec. 15, T. 8 N., R. 5 E., MDBM. About 5 miles east of Sacramento Civic Center. | Excavate from pit, which covers 15 acres, with dragline. Work wet to 45′ depth. Haul in end dump trucks about 1½ miles to plant. | Crush oversize in primary jaw, secondary roll crushers. Wash over standard vibrating screens; sand screw. | 150 tons per hour | Concrete sand and gravel, road base | No. of tests | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 |
| | | | | | | | | | Range of results | 2.66<br>2.63 | 2.75<br>2.78 | 2.2<br>2.3 | 0.7<br>0.9 | 2.8 | 14.0 | 4.4 | 1.6 | 81<br>90 | 1 |
| | | | | | | | | | Average 1957 | | | | | | | | | | Satis. |
| | | | | Teichert Aggregates P.O. Box 928 Sacramento Perkins Plant: SW¼ Sec. 13, T. 8 N., R. 5 E., MDBM. About 6 miles southeast of Sacramento Civic Center. | Excavate from pit which covers 50 acres, with dragline. Generally work below water table to 20′ depth. Haul in bottom dump trucks about 1 mile to plant. | Crush oversize in primary jaw, secondary and tertiary cone crushers. Rod mill manufactures bituminous sand. Wash in revolving scrubber when work dry pit. Wash over standard vibrating screens; sand screw. | 300 tons per hour | Concrete and bituminous sand and gravel, road base | No. of tests | 6 | 10 | 6 | 10 | 5 | 5 | 4 | 9 | 6 | 7 |
| | | | | | | | | | Range of results | 2.61 to 2.66 | 2.61 to 2.81 | 2.0 to 2.8 | 0.3 to 1.0 | 2.6 to 4.4 | 13.6 to 19.0 | 2.0 to 3.5 | 0.2 to 2.7 | 82 to 93 | 1 |
| | | | | | | | | | Average 1957-61 | 2.64 | 2.74 | 2.3 | 0.7 | 3.4 | 16.2 | 2.9 | 1.0 | 90 | Satis. |
| **American River,** Sacramento County, near Folsom Dam | Dredge tailings occur along the American River in the vicinity of Folsom Dam. Deposit covers an irregular area, 2-8 miles wide and about 8 miles long. Tailings are 15-25′ thick. | Portions of the tailings, which contain weathered decomposed material, have a soil cover. Fresher gravel has little or no overburden. Maximum size 8″. Rounded gravel. | Tailings are in recent stream bed and ancient floodplain deposits of the American River. See under these headings for rock types. | None | | | | | | | | | | | | | |
| **American River Tailings,** El Dorado County, at Lotus | Dredge tailings occur along the south fork of the American River between Lotus and Coloma, a distance of about 3 miles. Tailings range in width from 200-1,000′ and are up to 30′ thick. Developed area, near Lotus, covers about 0.1 miles. | Little overburden. Some weathered portions present. Maximum size averages 8″; about 5% plus 8″; up to 18″ boulders. No replenishment. Sub-rounded gravel. | Basic Igneous 37<br>Quartzitic metasediments...26<br>Vein quartz 9-13<br>Hornfels . .8<br>Andesite .4-7<br>Amphibolite 5<br>Granitic....2<br>Dioritic-gabbroic 2<br>(Data from USBR) | Chris Henningsen and Sons 1650 Highway 50 Placerville SW¼ Sec. 18, T. 11 N., R. 10 E., MDBM. At Lotus, about 11 miles north of Placerville. | Excavate with dragline in tailings at river's edge. Dig to about 12′ depth; to bedrock. Mine selectively to obtain sufficient fines, and avoid weathered "granitic" pebbles. | Crush oversize in primary jaw and secondary cone crushers. Wash over standard vibrating screens. Dewater sand in a screw. Use two Eagle screw-type classifiers to dewater gravel and remove trash. | About 120 tons per hour | Concrete sand and gravel, road base | No. of tests | 3 | 2 | 3 | 4 | 2 | 2 | 2 | 4 | 3 | 3 |
| | | | | | | | | | Range of results | 2.54<br>2.65<br>2.66 | 2.73<br>2.74 | 2.0<br>2.1<br>2.3 | 0.8 to 1.3 | 5.2<br>5.2 | 22.8<br>22.8 | 5.6<br>5.1 | 2.1 to 3.8 | 95<br>98<br>97 | 1-3 |
| | | | | | | | | | Average 1960-61 | | | | 1.0 | | | | 3.0 | | Satis. |
| **Antioch Sand,** Contra Costa County, near Antioch | Sand dunes 50-80′ high x 800′ wide derived from recent alluvium crop out along south bank of the Sacramento River for a distance of about 2 miles. Commercially developed area about 1,000′ long x 300′ wide x 35′ high. | No overburden. Fine yellow-brown, angular unconsolidated sand; about 95% passes 30 mesh screen. | Predominantly quartz and feldspar | William McCullough, contractor, Wilbur Ave., Antioch, operates the Morris sand pit. Working face is 35′ high x 300′ long. Loads trucks and railroad cars with Michigan front end tractor shovel. Sand used in bituminous and concrete mix, and as fill, without processing. | | | | | No. of tests | 3 | | 1 | | | | 1 | | | 3 |
| | | | | | | | | | Range of results | 2.65 to 2.68 | | | | | | 5.0 | | | 1-2 |
| | | | | | | | | | Average 1950-52 | 2.66 | | 3.2 | | | | | | | Satis. |

## DEPOSITS

## UTILIZATION

### Fixed Plant Operations

### Laboratory Test Data

| Name and Location | Type and Extent | General Features | Rock Types (percent) | Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | | Specific Gravity: Sand | Specific Gravity: Gravel | Absorption (percent): Sand | Absorption (percent): Gravel | Abrasion (percent loss): 100 rev. | Abrasion (percent loss): 500 rev. | Soundness (percent loss): Sand | Soundness (percent loss): Gravel | Sand Equiv. | Organic Content |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arroyo Del Valle,** and **Arroyo Del Mocho,** Alameda County, between Pleasanton and Livermore | Sand and gravel occur in the present channels of these two streams; and in the ancestral alluvial fan built up of deposits from these and other tributaries that have transported material into a shallow basin. Present stream channel deposits, which range in width from 100-500′, and depth from 35-70′, extend for several miles upstream. Alluvial basin deposits underlie most of the Livermore Valley. Commercially developed areas have concentrated in the mutual fan; and in the stream beds of Arroyo Del Valle and Arroyo Del Mocho near Pleasanton and Livermore. Area of proven gravel reserves covers several square miles. Deposits have been excavated to depth of 125′. Some clay lenses present. | Thickness of overburden ranges from 0 in stream bed, to about 35′ in the fan, increasing steadily from south to north as one approaches the valley floor. Maximum size gravel in stream bed is 10″, decreasing to 6″ in fan deposits near the Pleasanton-Livermore Highway. No replenishment on fan, however, stream bed is replenished in normal wet winters; sticks are problem in these instances. Subangular to subrounded gravel. | Graywacke 72<br>Chert 12<br>Vein quartz 10<br>Greenstone 5<br>Serpentine 1<br>Schist <1 | California Rock and Gravel Co.<br>582 Market St.<br>San Francisco<br>SE¼ Sec. 24 (proj.), T. 3 S., R. 1 E., MDBM.<br>About 2 miles southwest of Livermore. | Excavate, from alluvial fan, with dragline to 90′ depth. Work in 45′ benches. Load bottom dunip trucks for ¾ mile haul to plant. Up to 10′ of overburden. Maximum size 10″. About 80% minus 3″. Sand about 35%. | Pit run to trommel scrubber, and 6 x 20′ scrubber. Reduce oversize in primary and secondary gyratory crushers. Screen over standard triple and double deck vibrating screens; 2 sand screws. Minus ¾″ are crushed in a Gyradisc and classified in a sand screw. | About 400 tons of gravel per hour | Concrete, sand and gravel | No. of Tests | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| | | | | | | | | | Range of Results | 2.56 to 2.65 | 2.68 to 2.73 | 1.2 to 2.8 | 1 2 to 2.1 | 4.8 to 5.2 | 22.8 to 25.4 | 2.3 to 4.3 | 1.6 to 5.4 | 80 to 91 | 1 |
| | | | | | | | | | Average 1960-61 | 2.63 | 2.70 | 1.6 | 1.4 | 4 9 | 24 4 | 3.3 | 3.4 | 87 | Satis. |
| | | | | Deetz Sand and Gravel Co.<br>743 Pleasanton Ave.<br>Pleasanton<br>SW¼ Sec. 17, T. 3 S., R. 1 E., MDBM.<br>In Pleasanton. | Excavate, from trench 150′ wide in the stream bed of Arroyo Del Valle, with dragline to 40′ depth. Haul in end dump truck to nearby plant. | Remove oversize in field hopper. Screen pit run (dry) over bins for ready mix. | Small | Concrete sand and gravel | | | | | | | | | | | |
| | | | | Henry J. Kaiser Co.<br>300 Lakeside Dr.<br>Oakland<br>NE¼ Sec. 15 (proj.), T. 3 S., R. 1 E., MDBM.<br>Approx. 4 miles west of Livermore. | Excavate in benches from pit 500′ x 500′ in alluvial fan, with 2 draglines. Load a floating hopper, and a conveyer belt for transport to plant. Overburden up to 35′. Maximum size gravel 6″. | From pit, material conveyed to primary washing plant consisting of 3 trommel scrubbers and 4 dewatering screws. Washed material conveyed to surge pile. Main plant fed from surge pile with vibrating feeder. Crush oversize in primary jaw crusher, secondary and tertiary reduction in 4 cone crushers. Wash over 22 standard vibrating screens and 5 sand screws. Man- | 1000 tons per hour | Concrete and bituminous sand and gravel, road base | No. of Tests | 10 | 10 | 10 | 10 | 10 | 10 | 9 | 10 | 10 | 10 |
| | | | | | | | | | Range of Results | 2.64 to 2.77 | 2.67 to 2.71 | 1.1 to 1.6 | 1.1 to 1.8 | 3.8 to 5.4 | 22.6 to 25.8 | 2.0 to 4.0 | 1.9 to 7.2 | 79 to 91 | 1 |
| | | | | | | | | | Average 1960-62 | 2.66 | 2.69 | 1.3 | 1.3 | 4.7 | 24.2 | 3.2 | 3.2 | 84 | Satis. |

| | | |

## DEPOSITS

## UTILIZATION

| Name and Location | Type and Extent | General Features | Rock Types (percent) | Fixed Plant Operations: Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | Laboratory Test Data | Specific Gravity: Sand | Specific Gravity: Gravel | Absorption (percent): Sand | Absorption (percent): Gravel | Abrasion (percent loss): 100 rev. | Abrasion (percent loss): 500 rev. | Soundness (percent loss): Sand | Soundness (percent loss): Gravel | Sand Equiv. | Organic Content |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arroyo Seco,** Monterey County, near Greenfield | Stream bed deposit extends from confluence with Salinas River upstream for about 20 miles. Lower 8 miles of braided stream channels cover about ½ mile in width; over 15′ deep. Deposits in upper 12 miles are confined to the narrow stream bed with widths from 50′-100′. | Little to no overburden. Replenished in flood stages. Average maximum size ranges from 8″ (with about 5% 2′ boulders) upstream, diminishing to a maximum size of 4″ (with occasional 1′ boulders) at Delphia-Early Pit; abundant plus 1½″ in deposit. Little plus 2″ present in stream near Soledad. Subangular to subrounded gravel. | Granitic...60<br>Gneissic..25<br>Shale...15<br>Calcareous sandstone <1<br>Approx. 40% Monterey Formation "shale" at bridge crossing near Soledad. | Delphia and Early operated a portable plant in the Zabala pit in the E½ Sec. 35, T. 18 S., R. 6 E., MDBM., to produce road base and bituminous aggregate for Highway 101 construction. | | | | | No. of tests | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 |
| | | | | | | | | | Range of results | 2.54<br>2.54<br>2.56 | 2.58<br>2.42 | 1.3<br>2.4<br>2.2 | 4.9<br>1.7 | 7.2 | 32.0 | 5.6 | 5.6 | 90<br>96 | 1-2 |
| | | | | | | | | | Average 1959-60 | | | | | | | | | | Satis. |
| **Bear Creek,** Merced County near Merced | Stream bed deposit extends upstream for about 6 miles, from Planada to a dam ½ mile east of the Merced County boundary. Narrow, shallow long deposit; average width 100′; from 7-20′ deep. Bottom on a clay layer. | No overburden. Some replenishment in flood stage; maximum size 12″ diminishing to 6″ north of Planada. Sub-angular to sub-rounded gravel. | Metavolcanic 43<br>Hornfels..14<br>Metachert.14<br>Quartz..10<br>Greenstone 5<br>Granitic....4<br>Tactite....3<br>Basalt....2<br>Silicified volcanic. 2<br>Mica schist 1<br>Gneiss....1<br>Metagabbro 1 | Merced County operates a fixed plant consisting of a jaw, cone crushers, and vibrating screens in NE¼ Sec. 12, T. 7 S., R. 16 E., MDBM. Excavate from stream bed to a clay layer at 7′ depth. Produce road base and hot mix for use on county roads. | | | | | No. of tests | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | | | | | | | | Range of results | 2.80 | 2.83 | 1.6 | 0.7 | 3.6 | 18.0 | 1.6 | 2.5 | 90 | 1 |
| | | | | | | | | | Average | | | | | | | | | | Satis. |
| **Bear River,** Placer County, near Auburn and Colfax | Stream bed deposit extends south from Dutch Flat to Lake Combie, a distance of about 20 miles. Average width 500′, excavated to 40′ depths. Reworked hydraulic mining debris. | No overburden. Replenished in high water. Maximum size ranges from 12″ at Colfax to 3″ near Lake Combie. Subrounded gravel. | Quartz white...53<br>gray...13<br>Quartzite 8<br>Chert.....5<br>Metavolcanic 5<br>Andesitic 4<br>Schist.....4<br>Quartzitic metasedimentary 4<br>Silicified volcanic .2<br>Serpentine. 1<br>Slate. ...<1<br>Limonite. <1 | Bear River Sand and Gravel, Inc. P.O. Box 606 Colfax SE¼ Sec. 14, T.15N.,R.9E., MDBM. About 3 miles north of Colfax. About 1,000 feet south of Miles plant. | Excavates from stream bed with dragline to 4′ depth. Load end dump truck for haul of few hundred feet to plant. Maximum size 12″ boulder. | Crush plus 1½″ oversize with cone crusher; wash over standard vibrating screens; sand drag. Hand pick white cobbles for Lowry Paving Co. and crush in jaw crusher. | Estimated 50 tons per hour | Railroad ballast; concrete sand and gravel; road base | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Joe Chevreaux P.O. Box 65 Auburn NW¼ Sec. 30, T.14N.,R.9E., MDBM. About 11 miles north of Auburn. | Excavates with drag line to 40′ depth in stream bed. Haul in end dump trucks short distance to plant. About 60% quartz present. Few percent plus 2″ present. | Stockpile and feed plant with tractor. Crush plus 1½″ in primary jaw and secondary gyratory crushers. Wash over standard vibrating screens. Classify sand in hydraulic tank and screw; dewater in 2 screws. | 250 tons per hour | Concrete sand and gravel; blast, and plaster sand; exposed aggregate | No. of tests | 6 | 10 | 7 | 10 | 4 | 4 | 6 | 10 | 6 | 6 |
| | | | | | | | | | Range of results | 2.59 to 2.65 | 2.60 to 2.62 | 0.4 to 0.8 | 0.4 to 0.8 | 5.8 to 8.2 | 24.4 to 37.8 | 0.8 to 1.6 | 0.3 to 1.7 | 90 to 100 | 1 |
| | | | | | | | | | Average 1957-61 | 2.62 | 2.62 | 0.8 | 0.6 | 7.3 | 33.7 | 1.1 | 0.7 | 93 | Satis. |
| | | | | A. O. and K. M. Hansen Rt. 1, Box 472-L Grass Valley NE¼ Sec. 32, T.15N.,R.9E., MDBM. About 2 miles west of Colfax. Near Taylor Crossing, downstream from Lowry plant. | Excavate with dragline to 40′ depth in stream bed. Haul short distance to plant and stockpile. | Scalp off plus 1½″. Wash over standard vibrating screens; sand drag and screw. Use portable crusher for oversize. | 200 yards per hour | Concrete sand and gravel | No. of tests | 3 | 6 | 3 | 6 | 3 | 3 | 3 | 6 | 3 | 3 |
| | | | | | | | | | Range of results | 2.62 2.61 2.61 | 2.60 to 2.63 | 0.8 to 0.9 0.6 | 0.6 to 0.8 | 8.0 to 8.2 8.4 | 37.0 to 38.2 38.8 | 1.3 to 1.0 1.2 | 0.4 to 2.1 | 100 to 100 98 | 1 |
| | | | | | | | | | Average 1957-61 | | 2.61 | | 0.7 | | | | 1.1 | | Satis. |
| | | | | R. J. Miles P.O. Box 458 Colfax SE¼ Sec. 14, T.15N.,R.9E., MDBM. About 3½ miles north of Colfax. | Excavate with self-propelled scraper to about 4′ depth; haul short distance to plant. | Crush in primary jaw and secondary cone crushers. Wash over standard vibrating screens and in sand screws. | 100 tons per hour | Concrete and bituminous sand and gravel | No. of tests | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| | | | | | | | | | Range of results | 2.59 to 2.63 | 2.60 to 2.63 | 0.6 to 1.1 | 0.5 to 1.4 | 8.2 to 9.2 | 35.4 to 40.4 | 1.5 to 2.7 | 2.0 to 5.2 | 87 to 95 | 1 |
| | | | | | | | | | Average 1959-61 | 2.61 | 2.61 | 0.9 | 2.9 | 8.8 | 37.5 | 2.0 | 3.6 | 91 | Satis. |
| **Big Sur River,** Monterey County, near Big Sur | Stream bed deposit extends for about 1 mile upstream from the ocean, maximum width 0.1 mile, average width 200′; at least 10′ deep. | No overburden; replenished in flood stages; abundant plus 3″, about 5% boulders up to 2′ present. Subrounded gravel. | Granitic...57<br>Gneissic...21<br>Graywacke 19<br>Metavolcanic..... 2<br>Limestone <1<br>Schist . <1 | None | | | | | No. of tests | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| | | | | | | | | | Range of results | 2.64 2.66 2.66 | 2.70 2.65 2.69 | 1.4 1.5 3.2 | 1.1 1.1 0.8 | 7.2 4.0 6.6 | 34.0 29.8 28.6 | 2.4 3.7 2.3 | 2.2 2.4 4.0 | 96 93 94 | 2 |
| | | | | | | | | | Average 1957 | | | | | | | | | | Satis |
| **Blackwood Creek,** Placer County, near Tahoe City | Stream bed and floodplain deposit extends for several miles to the west of Lake Tahoe. Average width 500′; at least 20′ deep. | Little to no overburden. Replenished in winter. Abundant plus 4″. Maximum size 8″, with occasional boulders to 2′. Subangular to subrounded gravel. | Basic volcanic .68<br>Quartzitic metasedimentary .21<br>Metavolcanic 11 | Teichert Aggregates P.O. Box 928 Sacramento SW¼ Sec. 34, T. 15 N., R. 16 E., MDBM. Approx. 2½ miles west of Tahoe Pines. | Excavate with dragline from stream bed and floodplain to 20′ depth. Haul in end dump truck 0.1 mile to plant. | Scalp and crush plus 1½″ in primary jaw and secondary cone crushers. Wash over standard vibrating screens and in sand screw. Semiportable plant; crushers mounted on mobile truck body. | 100 tons per hour | Concrete sand and gravel, road base | No. of tests | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 |
| | | | | | | | | | Range of results | 2.57 | 2.59 2.59 | 5.7 | 2.4 2.8 | 7.4 | 31.8 | 8.7 | 6.6 7.1 | 91 | 2 |
| | | | | | | | | | Average 1961 | | | | | | | | | | Satis. |

| DEPOSITS | | | | UTILIZATION | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Fixed Plant Operations | | | | | Laboratory Test Data | | | | | | | | | |
| | | | | | | | | | | Specific Gravity | | Absorption (percent) | | Abrasion (percent loss) | | Soundness (percent loss) | | | |
| Name and Location | Type and Extent | General Features | Rock Types (percent) | Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | | Sand | Gravel | Sand | Gravel | 100 rev. | 500 rev. | Sand | Gravel | Sand Equiv. | Organic Content |
| Cache Creek, Yolo County, near Woodland | Stream bed and floodplain deposit extends from Yolo Upstream for about 5 miles. Deposit ranges from 0.1 to 0.5 miles in width and extends to at least 50′ in depth. Estimate 1 million cubic yards per mile of sand and gravel are available above summer water table. | No overburden. Replenished in flood stages. Maximum size 6″ diminishing to 1½″ at Yolo. Estimate 60% sand, few percent plus 1½″. Subangular to subrounded gravel. Deposits are described in detail in California Jour. Mines and Geology, vol. 54, no. 2. | Metagraywacke 32-38<br>Graywacke 21-23<br>Chert 11-18<br>Metabasic igneous 13-16<br>Vein quartz 8-10<br>Serpentine 1-2<br>Granitic, meta volcanic porphry, quartzite 1-5 | Granite Const. Co.<br>P.O. Box 7156<br>Sacramento<br>SE¼ Sec. 15 (proj.), T. 10 N., R. 1 E., MDBM.<br>About 2 miles southwest of Yolo. | Excavate with dragline in stream bed. Haul short distance to plant. | Crush oversize in a jaw crusher. Wash over standard vibrating screens; sand screw. | About 100 tons per hour | Concrete and bituminous sand and gravel, road base | | | | | | | | | | |
| | | | | Madison Sand and Gravel Co.<br>P.O. Box 66<br>Madison<br>NE¼ Sec. 22 (proj.), T. 10 N., R. 1 W., MDBM.<br>About 1 mile north of Madison. | Excavate with dragline; haul in trucks short distance to plant. | Crush oversize in 2 cone crushers. Wash over standard vibrating screens; sand screw. | About 350 tons per hour | Concrete sand and gravel, road base | No. of tests | 8 | 10 | 8 | 10 | 4 | 4 | 3 | 5 | 7 | 5 |
| | | | | | | | | | Range of results | 2.60 to 2.62 | 2.62 to 2.71 | 1.4 to 1.8 | 0.9 to 1.8 | 3.8 to 4.6 | 19.8 to 22.8 | 3.5 to 2.8 | 1.2 to 4.7 | 86 to 93 | 1 |
| | | | | | | | | | Average 1960-62 | 2.61 | 2.67 | 1.6 | 1.1 | 4.2 | 21.3 | | 2.6 | 87 | Satis. |
| | | | | Pacific Cement and Aggregates, Inc.<br>400 Alabama St.<br>San Francisco<br>SW¼ Sec. 14 (proj.), T. 10 N., R. 1 E., MDBM.<br>About 2 miles southwest of Yolo. | Excavate with dragline to depths of 25′. Haul in bottom dump trucks about 1 mile to plant. | Crush plus 1½″ in primary jaw and secondary roll crushers. Wash minus 1½″ in 2 log washers and over standard vibrating screens. Sand washed in 2 screw-type classifiers. | 200 tons per hour | Concrete and bituminous sand and gravel | No. of tests | 9 | 10 | 10 | 10 | 7 | 7 | 6 | 8 | 8 | 10 |
| | | | | | | | | | Range of results | 2.59 to 2.64 | 2.61 to 2.68 | 1.0 to 3.6 | 0.7 to 1.2 | 3.8 to 6.0 | 18.8 to 24.6 | 1.6 to 4.6 | 0.7 to 3.8 | 71 to 90 | 1 |
| | | | | | | | | | Average 1959-62 | 2.61 | 2.65 | 1.7 | 1.0 | 4.5 | 21.6 | 2.7 | 2.1 | 81 | Satis. |
| | | | | Schwarzgruber and Sons<br>28 W. Main St.<br>Woodland<br>NE¼ Sec. 22 (proj.), T. 10 N., R. 1 E., MDBM.<br>About 2 miles southwest of Yolo. | Excavate with dragline in stream bed. Haul short distance to plant. | Simple washing and screening plant. | 25 cubic yards per hour | Concrete sand and gravel | No. of tests | 2 | 2 | 1 | | 2 | 1 | 1 | 2 | | 2 |
| | | | | | | | | | Range of results | 2.67 2.62 | 2.65 2.67 | 1.4 | | 4.4 3.1 | 22.6 | 1.6 | 2.2 1.4 | | 2 |
| | | | | | | | | | Average 1955 | | | | | | | | | | Satis. |
| | | | | Teichert Aggregates<br>P.O. Box 928, Sacramento<br>SW¼ Sec. 22 (proj.), T. 10 N., R. 1 E., MDBM.<br>About 3 miles | Excavate with dragline. Haul in bottom dump trucks about ¼ mile to plant. | Crush oversize in primary jaw (2), secondary cone (2) crushers. Wash over standard vibrating screens, sand screw. | 235 tons per hour washed aggregate | Concrete and bituminous sand and gravel, road base | No. of tests | 9 | 10 | 10 | 10 | 7 | 7 | 7 | 9 | 10 | 10 |
| | | | | | | | | | Range of results | 2.61 to 2.67 | 2.62 to 2.70 | 1.2 to 1.6 | 0.4 to 1.3 | 3.8 to 4.8 | 18.9 to 21.4 | 1.9 to 11.4 | 0.6 to 6.9 | 75 to 92 | 1 |
| | | | | | | | | | Average 1956-61 | 2.63 | 2.66 | 1.5 | 1.0 | 4.2 | 20.2 | 3.9 | 2.0 | 84 | Satis. |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | southwest of Yolo. | | | | | | | | | | | | | | | | |
| | | | | The Madison Sand and Gravel Co. formerly operated a plant near Esparto to provide some of the coarse aggregate for Monticello Dam. | | | | | | | | | | | | | | | | |
| **Cache Creek,** Yolo County, near Rumsey | Gravel bars occur in Capay Valley near Rumsey, and Brooks. The bars range from 0.1 to 0.2 mile in width and from 20 to 30′ in depth. Estimate 3 million cubic yards in deposit at Rumsey, 5 million cubic yards near Brooks. | No overburden. Maximum size at Rumsey 8″ diminishing to 3″ maximum at Brooks. Replenished in flood stage. Sub-angular to sub-rounded gravel. Deposits are described in California Jour. Mines and Geology, vol. 54, no. 2. | Graywacke 31–36<br>Meta-graywacke 30–32<br>Metabasic igneous 14–19<br>Chert.. 2–10<br>Vein quartz 3–7<br>Limestone 2–6<br>Serpentine 2–3<br>Granitic, meta-volcanic porphyry, quartzite 1–5 | None | | | | | | | | | | | | | | | | |
| **Calaveras Creek,** Alameda County, near Sunol | Stream bed and adjacent flood-plain deposit extends for about 3 miles south from its confluence with Alameda Creek near Sunol, to the head of Sunol Valley. Width of deposit ranges from 100′ in the south end of the valley, to ¾ mile near Hway. 21. At least 40′ deep. | No overburden in stream bed to few feet on floodplain. No replenishment. Maximum size 8″; a few 12″ boulders present. A brown weathered zone overlies blue fresher material at 5-40′ depth and contains some clay in the fine fraction. Sub-rounded gravel. | Metagray-wacke .. 96<br>Chert 3<br>Schist .... 1 | Concrete Service Co., 960 Sunol St. San Jose Pit in SW ¼ Sec. 21, T. 4 S., R. 1 E., MDBM. About 2 miles south of Sunol. | Excavate with self-propelled scraper assisted by tractor-pusher to load. Haul about 0.4 mile north to plant. | Plus 5″ is crushed in primary jaw crusher; plus 2½″ in secondary cone. Feed from crushers recombined and all go to revolving scrubber. Fines (minus ¼″) dewatered in twin screw type classifier. Plus ¼″ washed over standard vibrating screens. A tertiary roll crusher is used to produce ¾″ maximum crushed gravel. | About 250 tons per hour | Concrete and bituminous sand and gravel, road base | | | | | | | | | | |
| | | | | Santa Clara Sand and Gravel Co. P.O. Box 295 Santa Clara SE ¼ Sec. 21 (proj.), T. 4 S., R. 1 E., MDBM. About 2 miles south of Sunol. | Excavate to about 15′ depths in stream channel with front-end shovel loader. Load trucks for haul of several hundred feet to plant. Work above water table. | Plus 1½″ is crushed in dry side of plant by two gyratory crushers, screened and stockpiled. Minus 1½″ is washed in a trommel-scrubber and over standard vibrating screens; sand in a twin screw sand classifier. Plant started in Summer 1961. | 400 tons per hour of washed aggregate | Concrete and bituminous sand and gravel, road base | No. of tests | 7 | 10 | 9 | 10 | 7 | 7 | 7 | 14 | 8 | 10 |
| | | | | | | | | | Range of results | 2.60 to 2.66 | 2.62 to 2.67 | 1.6 to 3.0 | 0.9 to 2.4 | 4.8 to 7.0 | 23.6 to 29.8 | 2.6 to 9.8 | 1.5 to 4.9 | 70 to 91 | 1 |
| | | | | | | | | | Average 1958-61 | 2.63 | 2.65 | 2.1 | 1.5 | 5.4 | 25.8 | 5.3 | 2.8 | 80 | Satis. |

| DEPOSITS | | | | UTILIZATION | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Fixed Plant Operations | | | | | Laboratory Test Data | | | | | | | | | | |
| | | | | | | | | | | Specific Gravity | | Absorption (percent) | | Abrasion (percent loss) | | Soundness (percent loss) | | | |
| Name and Location | Type and Extent | General Features | Rock Types (percent) | Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | | Sand | Gravel | Sand | Gravel | 100 rev. | 500 rev. | Sand | Gravel | Sand Equiv. | Organic Content |
| **Calaveras River,** San Joaquin County, near Bellota | Stream bed and flood plain deposit extends from Bellota to Jenny Lind, a distance of about 10 miles. Deposit, including adjacent flood plain, ranges from ¼ to 1 mile in width and is from 25-35′ deep. For about 4 miles downstream from Jenny Lind, the stream bed has been dredged, and tailings from 0.1 to 0.5 mile in width and 15′ high remain. | Little overburden. Slight replenishment in flood stage. Gravel in tailings is about 12″ maximum, and diminishes downstream to about 1″ plus 3″ near Bellota. Where commercially developed, sand content ranges from 40-55%. About 25% plus ¾″ gravel. Subrounded gravel. | Vein quartz 20-25<br>Quartzitic metasedimentary 25 ±<br>Greenstone 30-50<br>Tertiary volcanic 2-4<br>Basic igneous, 1-3<br>Granitic Trace<br>(California Jour. Mines and Geology, vol. 51, no. 1, p. 61) | Calaveras Rock Co. 22 N. San Joaquin Stockton Center Sec. 35, T. 3 N., R. 9 E., MDBM. About 3 miles east of Bellota. | Bulldozer loosens gravel for self-propelled scraper to excavate. Work to water table, about 6′ deep. Scraper hauls about 1000′ to nearby plant. | Plus ½″ or ¼″ is scalped off standard vibrating screens and is crushed in a portable unit consisting of a primary jaw and secondary roll crushers. Dry operation. | About 50-75 tons per hour of crusher run base | Road base, screenings | | | | | | | | | | |
| | | | | Teichert Aggregates operates a portable plant in the dredge tailings at Jenny Lind. | | | | | | | | | | | | | | | |
| **Cantua Creek,** Fresno County, about 25 miles north of Coalinga | Stream bed and alluvial fan deposit at head of Cantua Creek fan. Deposit extends for about 2 miles upstream from intersection with Highway 33; gravelly portion restricted to head of fan; width ranges from 50-500′; shallow deposit. | Some replenishment; thickness of overburden ranges from 0 in stream bed to 3′ of silty sand in fan; abundant plus 1½″, maximum 6″. Subangular to subrounded gravel. Some caliche coating present. | Sandstone 45<br>Serpentine 38<br>Limestone 7<br>Siltstone-calcareous 4<br>Vein quartz 2<br>Chert 1<br>Vein calcite <1<br>Opaline shale <1<br>Montmorillonite <1<br>Limonite concretion <1<br>Magnesite <1 | Used by California Division of Highways in road maintenance as base material and in asphalt patching. Use pit in NE¼ Sec. 30, T. 18 S., R. 14 E., when necessary. | | | | | | | | | | | | | | |
| **Carmel River,** Monterey County, east of Carmel | Stream bed and flood plain deposit extends for about 15 miles upstream from the mouth at Carmel Bay. Channel deposits are narrow, about 100′ average width and over 20′ deep. | Little to no overburden; replenished in flood stage. Maximum size about 8″ at head of valley dimishes to 4″ maximum near Highway 1, where it is excessively sandy. Sub-rounded | Granitic 78<br>Shale 13<br>Gneissic 9 | Valley Rock and Adobe Co. P.O. Box 64, Carmel Valley SE¼ Sec. 24, T. 16 S., R. 1 E., MDBM. About 8 miles east of Carmel. | Excavates with front-end tractor shovel from stream bed to 10′ depth. Haul short distance to plant in end dump trucks. Maximum size 6″, some 1′ boulders pres- | Single jaw crusher reduces plus 1½″, wash over trommel screen. | About 100 tons per day | Concrete and bituminous sand and gravel | | | | | | | | | | | |

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| | Adjacent flood plain contains gravel under silty veneer. Wells encounter gravel to 90′ depths in valley. | gravel. | | | ent. Sand about 70% to gravel 30%. | | | | | | | | | | | | | | |
| **Carson River (West Fork),** Alpine County, near Woodfords | Floodplain of West Fork Carson River. Developed area covers about 0.1 square mile. Deposits at least 20′ thick. | About 3′ of overburden. No replenishment. Maximum size 6″. Weathered material to 10′ depth in places. Sub-angular to sub-rounded gravel. | Quartzitic metasedimentary and metavolcanic. 69<br>Andesite-basalt.... 24<br>Granitic.. 7 | Nevada Lumber Co. Tahoe Valley SW¼, Sec. 6, T. 10 N., R. 19 E., MDBM. About 9 miles west of Woodfords. | Excavate with tractor from pit approx. 100′ x 300′, to about 20′ depth. | Portable unit fed by tractor. Wash in trommel-scrubber; hydraulic sand tank. Dewater with screw. | Estimated 100 tons per hour | Concrete sand and gravel | No. of Tests | 2 | 4 | 2 | 4 | 2 | 2 | 2 | 4 | 2 | 1 |
| | | | | | | | | | Range of Results | 2.60<br>2.61 | 2.63 to 2.70 | 2.9<br>2.2 | 1.1 to 1.8 | 5.0<br>4.8 | 22.0<br>21.6 | 5.8<br>7.7 | 3.1 to 6.0 | 86<br>92 | 1 |
| | | | | | | | | | Average 1960 | | 2.67 | | 1.5 | | | | 4.3 | | Satis. |
| **Chalone Creek,** Monterey County, near King City | Stream bed deposit extends for several miles upstream from confluence with Salinas River. Narrow deposit—about 150′ maximum width; at least 20′ deep. | Little or no overburden. Replenished in flood stage. Excessively sandy near confluence but containing more gravel farther upstream. Few % plus 1½″ at Metz, increasing to about 10% plus 2″, three miles upstream | Volcanic (predom. rhyolite) .86<br>Granitic.. 14<br>(Div. of Hways) | South Counties Sand and Gravel Co. Metz Road, King City NE¼ Sec. 21, T. 18 S., R. 7E., MDBM. About ½ mile southeast of Metz. | Excavate from pit in stream bed to 15′ depth with front-end tractor shovel (which feeds plant). | Wash over double deck standard vibrating screens and in sand screw. Scalp off plus 1½″. | 50 tons per hour | Concrete sand and gravel | No. of tests | 10 | 7 | 10 | 7 | 4 | 4 | 10 | 7 | 4 | 3 |
| | | | | | | | | | Range of results | 2.54 to 2.59 | 2.47 to 2.49 | 1.3 to 1.7 | 2.3 to 3.3 | 4.4 to 6.4 | 25.8 to 27.6 | 2.3 to 3.6 | 1.6 to 5.6 | 88 to 92 | 1 |
| | | | | | | | | | Average 1959-61 | 2.56 | 2.48 | 1.5 | 2.8 | 5.7 | 26.6 | 3.0 | 4.1 | 90 | Satis. |
| **Chili Gulch Deposit,** Calaveras County, near Mokelumne Hill | Tertiary conglomerate (auriferous channel) underlies ridge on east flank of Chili Gulch. Ridge trends northeast and is about 500′ wide. Deposit covers several acres, to at least 50′ depth. Conglomerate is unconsolidated and uncemented although some hard compacted portions are present. Deposit is unstratified although occasional sand lenses up to 1′ thick and 10′ long occur. (Hydraulic debris from conglomerate that washed down Chili Gulch was formerly worked commercially for aggregate) | Few feet of soil present as overburden. Dry pit. Approximate proportion of gravel to sand is 55 45. Maximum size gravel is 8″. Sub-angular to sub-rounded gravel. | Vein quartz 52-59<br>Quartzite (meta chert) 13-25<br>Schist ..10-26<br>Quartz schist... 6-9 | Neilsen's Gravel Plant P.O. Box 457 San Andreas NW¼ Sec. 25, T. 5 N., R. 11 E., MDBM. About 3 miles south of Mokelumne Hill. | Excavate with tractor, equipped with ripping teeth, that bulldozes material to a portable field hopper. Truck about 500′ downhill to plant. | Crush oversize in primary jaw and secondary cone crushers. Wash in trommel screens; sand drag, sand screws, cyclone. | About 100 tons per hour | Concrete sand and gravel, road base | No. of tests | 3 | 4 | 3 | 4 | 2 | 2 | 2 | 4 | 3 | 3 |
| | | | | | | | | | Range of results | 2.59<br>2.59<br>2.58 | 2.60 | 1.0 to 1.3<br>1.0 | 0.7 to 1.0 | 9.8<br>10.0 | 41.2<br>42.0 | 4.9<br>5.5 | 1.9 to 3.3 | 75 to 83 | 1 |
| | | | | | | | | | Average 1959-60 | | 2.60 | | 0.9 | | | | 2.5 | 80 | Satis. |

## DEPOSITS

## UTILIZATION

| Name and Location | Type and Extent | General Features | Rock Types (percent) | Fixed Plant Operations: Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | Laboratory Test Data | Specific Gravity: Sand | Specific Gravity: Gravel | Absorption (percent): Sand | Absorption (percent): Gravel | Abrasion (percent loss): 100 rev. | Abrasion (percent loss): 500 rev. | Soundness (percent loss): Sand | Soundness (percent loss): Gravel | Sand Equiv. | Organic Content |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Conn Creek,** Napa County, near Rutherford | Stream bed deposit extends from intersection of stream with Highway 128 south for approx. 2 miles. Width ranges from 100-500'. | Little to no over burden. No replenishment due to dam upstream. Maximum size 4". abundant plus 1½". Sub-angular to sub-rounded gravel. | Graywacke 68<br>Basic volcanic 15<br>Chert 7<br>Serpentine 4<br>Greenstone 3<br>Schist 2<br>Vein quartz 1 | McGill Rock and Sand Co. 933 Main St. Helena Pit in NE¼ Sec. 10 (proj.). T. 7 N., R. 5 W., MDBM. Plant NW ¼ Sec. 14, (proj.). On Skellinger Lane, about 2 miles due east of Rutherford. | Excavate with a clamshell bucket from several bars; haul about 2 miles south to plant. | Reduce oversize in jaw crushers; wash over standard vibrating screens and in sand screw. | Estimate 75 tons per hour | Concrete sand and gravel | No. of tests | 2 | 5 | 1 | 2 | 2 | 2 | 2 | 5 | 1 | 1 |
| | | | | | | | | | Range of results | 2.54<br>2.69 | 2.57<br>to<br>2.61 | 3.8 | 2.0<br>2.2 | 6.2<br>5.9 | 26.8<br>26.0 | 10.1<br>11.1 | 3.3<br>to<br>6.4 | 88 | 2 |
| | | | | | | | | | Average 1952-58 | | 2.59 | | | | | | 4.9 | | Satis. |
| **Corral Hollow Creek,** San Joaquin County, near Tracy | Alluvial fan deposit, triangular in plan with apex at canyon. Gravelly portion of deposit, which is adjacent to the present creek drainage, increases in width from about 1,000' at apex to about 2½ miles downstream near Carbona, in a distance of about 4 miles. Sand and gravel occur to depths of from 100-135'. | Overburden ranges from 3-16'. No replenishment. Maximum size 6". About 40% plus 1". Thin clay lenses interbedded with sand and gravel. Ratio of sand to gravel about 30-70 Sub-angular to sub-rounded gravel. | Metagraywacke 50-75<br>Veinlet quartz 10-15<br>Chert 10-15<br>Metabasic igneous 5-10<br>Andesite 5-10<br>Sandstone 1-5<br>Quartzitic metamorphic 1<br>Schist 1<br>(Data from USBR) | Pacific Cement and Aggregates, Inc. 400 Alabama St. San Francisco NW¼ Sec. 16, T. 3 S., R. 5 E., MDBM. About 1 mile southwest of Carbona (near Tracy). | Excavate from pit about a square mile in extent. Work in benches 30' high with dragline. Haul in bottom dump trucks about ½ mile to plant. | Feed to primary washing unit consisting of a trommel scrubber, a rake, and screw classifier. Plus 2½" crushed in primary jaw, secondary cone (2) crushers. Rewash sand in rake classifier after screening. Use standard vibrating screens. | 450 tons per hour | Concrete and bituminous sand and gravel, road base | No. of tests | 7 | 10 | 8 | 10 | 4 | 4 | 5 | 10 | 8 | 10 |
| | | | | | | | | | Range of results | 2.60<br>to<br>2.64 | 2.60<br>to<br>2.66 | 1.4<br>to<br>1.6 | 1.1<br>to<br>1.7 | 4.4<br>to<br>5.6 | 23.2<br>to<br>27.6 | 1.7<br>to<br>3.9 | 0.9<br>to<br>3.7 | 83<br>to<br>90 | 1 |
| | | | | | | | | | Average 1958-60 | 2.61 | 2.63 | 1.5 | 1.4 | 5.0 | 25.2 | 2.6 | 2.2 | 87 | Satis. |
| | | | | Teichert Aggregates P.O. Box 928 Sacramento SE¼ Sec. 9, T. 3 S., R. 5 E., MDBM. About ½ mile southwest of Carbona (near Tracy). | Excavate from pit with dragline. Work pit, approx. 1,000' x 1,500' x 75' deep, in 20' high benches. Haul about 0.1 mile to plant in bottom dump trucks. | Crush oversize in primary jaw, secondary cone (3), and tertiary roll (2) crushers. Wash gravel in 3 rotary scrubbers and over standard vibrating screens. Wash and classify sand in 3 screws. | 500 tons per hour | Concrete and bituminous sand and gravel, road base | No. of tests | 7 | 10 | 6 | 10 | 4 | 4 | 3 | 7 | 7 | 5 |
| | | | | | | | | | Range of results | 2.56<br>to<br>2.62 | 2.64<br>to<br>2.77 | 1.4<br>to<br>1.7 | 1.1<br>to<br>1.4 | 4.6<br>to<br>5.0 | 22.6<br>to<br>24.6 | 2.8<br>to<br>5.0 | 0.7<br>to<br>2.3 | 64<br>to<br>88 | 1 |
| | | | | | | | | | Average 1958-61 | 2.60 | 2.66 | 1.5 | 1.2 | 4.7 | 23.4 | 3.9 | 1.5 | 78 | Satis. |
| | | | | The Stanfield and Moody Sand and Gravel Co. excavates material from a pit 1,000' long x 300' wide x 40' deep in NE¼ Sec. 8, T. 3 S., R. 5 E., MDBM. Produce road base in a portable plant. | | | | | | | | | | | | | | | | |

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| **Coyote Creek,** Santa Clara County, near San Jose | Stream bed and floodplain deposit extends for about 13 miles upstream from its intersection with Highway 101 by-pass to below Anderson Dam. Stream bed is narrow, average width 100 yds. Floodplain deposits, particularly in the southern portion, attain widths up to 500'. Deposit ranges in depth from 30 to 50'. | Thickness of overburden ranges from 0-3'; mostly silt. No replenishment. Maximum size 6" diminishes downstream to 4". Deficient in fine sand. Sub-angular to sub-rounded gravel. | Graywacke 74<br>Vein quartz 8<br>Chert 7<br>Serpentine. 4<br>Meta-volcanic . 3<br>Limestone . . 3<br>Granitic . . 1 | Atlas Materials Co.<br>460 Park Ave.<br>San Jose<br>SE¼ Sec. 1 (proj.), T. 9 S., R. 2 E., MDBM.<br>About 15 miles south of San Jose. | Excavate from several acres with a tractor bulldozer that pushes pit run to a conveyor belt. Work to depths of about 25'. Convey about 200' to plant. | Pit run goes to trommel screen; crush oversize in primary jaw and secondary cone crushers; process fine aggregate in a hydraulic sand tank and de-water in twin screw-type classifier | About 200 tons per hour | Concrete and bituminous sand and gravel, bituminous aggregate, road base | No. of tests | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 |
| | | | | | | | | | | Range of results | 2.56 | 2.63 to 2.64 | 3.2 | 1.7 to 2.0 | 5.8 | 26.9 | | 4.8 to 2.8 | 67 | |
| | | | | | | | | | | Average 1958 | | | | | | | 10.0 | | | Satis. |
| | | | | Coyote Sand and Gravel, Inc.<br>675 Tennant Ave.<br>San Jose<br>Plant:<br>SE¼ Sec. 8 (proj.), T. 8 S., R. 2 E., MDBM.<br>About 5 miles south of San Jose.<br>Pit:<br>NW¼ Sec. 26, T. 8 S., R. 2 E., MDBM.<br>About 3 miles south of plant. | Excavate from stream bed with dragline to about 10' depth in trench about 50' wide. Work a few feet below water table. Max. size 4". Overburden 1-2'. | Pit run goes thru grizzly, into a feeder, and conveyed to washing screen. From screen plus 2½" goes to a primary jaw crusher; minus 2½" to a roll crusher. Feed all goes to a revolving scrubber; sand to an Eagle twin screw-type classifier. | About 200 tons per hour | Concrete sand and gravel, road base | | | | | | | | | | |
| | | | | | | | | | | No. of tests | 7 | 10 | 6 | 10 | 5 | 5 | 7 | 10 | 7 | 7 |
| | | | | | | | | | | Range of results | 2.57 to 2.59 | 2.60 to 2.64 | 1.8 to 2.5 | 1.2 to 2.1 | 4.6 to 5.6 | 23.8 to 26.0 | 4.5 to 7.8 | 2.8 to 9.8 | 75 to 96 | 1 |
| | | | | | | | | | | Average 1958-61 | 2.58 | 2.61 | 2.3 | 1.8 | 5.2 | 25.0 | 6.3 | 5.6 | 85 | Satis. |
| | | | | Santa Clara Sand and Gravel Co.<br>P.O. Box 295<br>Santa Clara<br>SE¼ Sec. 16, T. 8 S., R. 2 E., MDBM.<br>About 6 miles south of San Jose. | Excavate from floodplain with front end shovel loader to water table at about 4'. Load bottom dump trucks for haul of about 0.1 mile to plant. Also have pit at end of Durnett Ave. in Sec. 9 (proj.), about 6 miles south of plant. | Feed goes to trommel scrubber; gravel to log washer, re-combined and washed over standard vibrating screens. Sand processed in Eagle screw, cyclone, and another screw classifier. Plus 2½" crushed in a primary jaw; plus 1½" in a roll crusher. Tertiary roll crusher available for further reduction. Re-wash over screens and stack. Heart of plant is Cedar Rapids portable crusher | About 200 tons per hour | Concrete sand and gravel, bituminous gravel | | | | | | | | | | |

## DEPOSITS

## UTILIZATION

### Fixed Plant Operations

### Laboratory Test Data

| Name and Location | Type and Extent | General Features | Rock Types (percent) | Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | | Specific Gravity: Sand | Specific Gravity: Gravel | Absorption (percent): Sand | Absorption (percent): Gravel | Abrasion (percent loss): 100 rev. | Abrasion (percent loss): 500 rev. | Soundness (percent loss): Sand | Soundness (percent loss): Gravel | Sand Equiv. | Organic Content |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Domengine Formation** Contra Costa County, near Walnut Creek | Eocene Domengine Formation contains sandstones that generally strike northwest and dip 25-40° N. Developed area is approx. 1,000′ wide x 400′ long. Excavate to 90′ depth. Sandstone member is 75′ to 400′ thick. | Little overburden. Weakly-consolidated, compacted, uncemented massive, well-sorted medium sand. Some iron-oxide staining. Hard, cemented concretions present. Angular grains. | Quartz 80-90<br>Feldspar 10-20 | Silver Sand Co.<br>P.O. Box 5<br>Cowell<br>SE. ¼ Sec. 8 (proj.), T. 1 N., R. 1 W., MDBM.<br>About 4 miles northeast of Walnut Creek. | Excavate with bulldozer, which pushes sand into a feeder. Discard occasional 8′ boulders of cemented sandstone. | Scalp off plus No. 8, and pump slurry to a 48″ Wemco sand screw. Fines are recovered in a Krebs Cyclone. Sand is stockpiled by a radial stacker. | 60 tons per hour washed sand | Concrete and plaster sand | | | | | | | | | | | |
| **Donner Lake Deposit,** Nevada County, near Truckee | Fluvial-glacial deposit covers about 2 square mile area between Donner Lake and Truckee. At least 35′ deep, although gravel encountered in wells to 90′. Developed area about ¼ square mile. | About 2′ of overburden, no replenishment. Abundant plus 4″. Maximum size 8″; some boulders up to 3′ present. Crudely stratified. Sub-angular to sub-rounded gravel. | Andesite 90<br>Dacite 4<br>Quartz diorite 4<br>Tuff breccia 2 | Clements Rock Products, Inc.<br>37350 Sequoia Rd., Fremont<br>SW ¼ Sec. 17, T. 17 N., R. 16 E., MDBM.<br>About 2 miles west of Truckee. | Excavate with dragline and haul in bottom dump trucks. Also excavate with bucket dredge from pit 500′ x 300′; below water to 35′ depth. Crush plus 4″ on dredge and pump raw material several hundred feet to plant. | Material from dredge passed over screens and in hydraulic sand tank; and sand screws. Oversize is crushed by primary jaw and secondary cone (2) crushers, and washed again in trommel-scrubber. | 500 tons per hour | Concrete and bituminous sand and gravel | No. of tests | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 15 | 10 | 10 |
| | | | | | | | | | Range of results | 2.54 to 2.60 | 2.56 to 2.61 | 3.6 to 4.2 | 2.4 to 3.3 | 5.5 to 7.4 | 27.0 to 30.4 | 5.5 to 9.3 | 3.1 to 11.6 | 86 to 97 | 1 |
| | | | | | | | | | Average 1959-61 | 2.57 | 2.59 | 3.9 | 2.8 | 6.4 | 29.1 | 7.2 | 7.2 | 93 | Satis. |
| **Dry Creek,** Sonoma County, tributary to Russian River, near Healdsburg | Stream bed deposit extends for about 3 miles upstream from junction with Russian River. Average width about 500′, at least 20′ deep. | Replenished in flood stages. No overburden. Abundant plus 2½″. Maximum size 6″. Sub-angular to sub-rounded gravel. | Graywacke 48<br>Metavolcanic 18<br>Chert 12<br>Vein quartz 12<br>Schist 4<br>Granitic 3<br>Serpentine 3<br>Basalt <1 | Harvey Taylor Gravel Co.<br>523 Mason St.<br>Healdsburg<br>NE ¼, Sec. 29 (proj.), T. 9 N., R. 9 W., MDBM.<br>About ½ mile west of Healdsburg. | Excavate from dry stream bed with front end tractor-shovel. Haul few hundred feet to plant in end dump truck. Dig to about 5′, above summer water table. | Simple screening plant. Wash over standard vibrating screens, sand drag. | 75 tons per hour | Concrete sand and gravel, road base | | | | | | | | | | | |
| | | | | Trudell Rock Co.<br>700 West Side Road<br>Healdsburg<br>NE ¼ Sec. 29 (proj.), T. 9 N., R. 9 W., MDBM.<br>About ½ mile west of Healdsburg. | Excavate from dry stream bed with front end shovel loader. Dig to about 4′ depth. Some clay pockets present. Haul in end dump truck short distance to plant. | Simple screening plant. Wash over screens; sand drag. | Estimate 50 tons per hour | Concrete sand and gravel, drain gravel | | | | | | | | | | | |

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| **Garzas Creek,** Stanislaus County, west of Gustine | Stream bed deposit extends for about 2 miles west of the Delta Mendota Canal. Shallow, narrow deposit—width ranges from 50-500′. | Replenished in flood stage, no overburden. Maximum size 6″, about 30% plus 2″. Sub-angular to sub-rounded gravel. | Graywacke 73<br>Volcanic 8<br>Granitic 4<br>Vein quartz 4<br>Chert 3<br>Metavolcanic 3<br>Calcareous siltstone 2<br>Schist 2<br>Quartzite 1 | None | | | | | No. of tests | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | | | | | | | | Range of results | 2.65 | 2.63 | 1.5 | 1.4 | 7.8 | 33.2 | 2.4 | 6.3 | 93 | 1 |
| | | | | | | | | | Average 1961 | | | | | | | | | | Satis. |
| **Guadalupe Creek,** Santa Clara County, near San Jose | Stream bed and floodplain deposits extend for about 2 miles to the south, from a point about 5 miles south of the center of the City of San Jose. Upstream, in the southern portion, the gravels are restricted to the stream bed; but where commercially developed downstream near San Jose, attain a width of approx. 500′ including the adjacent floodplain. Deposit is at least 30′ deep. | Slight overburden. No replenishment. Maximum size 6″, occasional boulder up to 10″ present. Slightly deficient in the finer sand sizes. Sub-angular to sub-rounded gravel. | Graywacke 61<br>Greenstone 13<br>Chert 11<br>Silica-carbonate 9<br>Serpentine 2<br>Vein calcite 1<br>Limonite 1<br>Limestone 1<br>Glaucophane schist 1 | Leo F. Piazza Paving Co. 985 Downer Ave. San Jose SW ¼ Sec. 9, T. 8 S., R. 1 E., MDBM. About 5 miles south of San Jose. | Excavate from floodplain with dragline to 30′ depth. Load bottom-dump trucks thru field bunkers for short haul to plant. Pit worked below water table. | Scalp off plus 1¾″ gravel with trommel and crush in one primary jaw and two secondary cone crushers. Wash over standard vibrating screens, and sand screw. | 1,600 tons per 8 hours | Bituminous sand and gravel | No. of tests | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | | | | | | | | Range of results | 2.62 | 2.67 | 3.5 | 1.7 | 5.0 | 21.0 | 8.0 | 4.0 | 87 | 1 |
| | | | | | | | | | Average 1956 | | | | | | | | | | Satis. |
| | | | | L. C. Smith 1st and Railroad San Mateo SW ¼ Sec. 4 (proj.), T. 8 S., R. 1 E., MDBM. About 3 miles south of San Jose. | Excavate from floodplain with dragline to 25′ depth. 1-4′ of overburden present. Haul in bottom dump trucks short distance to plant. Dry pit. | Pit run goes to trommel screen; fines go to Eagle hydraulic tank classifier and 44″ dewatering screw. (Adding primary Kue Ken jaw and secondary Kue Ken cone crushers to crush plus 1″, which was being stockpiled.) | 1,500 tons per day of gravel | Bituminous sand and gravel | | | | | | | | | | |
| **Hospital Creek,** San Joaquin County, near Tracy | Stream bed deposit extends from intersection with Delta Mendota canal upstream for about 3 miles. Average width 600′, at least 12′ deep. | No overburden. Some replenishment in flood stage. Maximum size 6″. Sub-rounded to sub-angular gravel. | Feldspathic sandstone 40-60<br>Vein quartz 10-20<br>Chert 20-30<br>Panoche sandstone 5-10<br>Basic igneous 1-5<br>(Califor. Jour. Mines and Geol., Jan. 55, p. 61) | None | | | | | | | | | | | | | | | |
| **Irvington Gravel,** Alameda County, near Irvington | Lower Pleistocene Irvington gravels, an old alluvial fan deposit, crops out in the vicinity of Irvington and contains sandy beds that strike northwest and dip about 20° to the northeast. Conglomerate lenses up to 20′ thick are interbedded with | Overburden from 10-30′ of silt, clay and fine sand. Gravel predominantly in 1-1½″ range; few ¾ plus 1½″, up to 4″ maximum. Conglomerate uncemented, unindurated, compacted. Sub-angular to sub-rounded gravel | Graywacke 75<br>Chert 10<br>Greenstone 5<br>Schist 5<br>Vein quartz 2<br>Meta-argillite 1<br>Serpentine 1<br>Granitic 1 | Bell pit in NW ¼ Sec. 2, T. 5 S., R. 1 W., MDBM. is excavated for pit run material, but was formerly worked for concrete aggregate. Plant has been inoperative since 1960 as property is on right-of-way of new State freeway. | | | | | | | | | | | | | | | |
| | | | | Henry Sand operated a pit and plant in SW ¼ Sec. 2, T. 5 S., R. 1 W., MDBM. for a brief interval. Pacific Cement and Aggregates purchased plant in 1961 and also operated briefly. Property was idle in 1962. | | | | | | | | | | | | | | | |

| DEPOSITS | | | | UTILIZATION | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Fixed Plant Operations | | | | | Laboratory Test Data | | | | | | | | |
| | | | | | | | | | | Specific Gravity | | Absorption (percent) | | Abrasion (percent loss) | | Soundness (percent loss) | | | Organic Content |
| Name and Location | Type and Extent | General Features | Rock Types (percent) | Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | | Sand | Gravel | Sand | Gravel | 100 rev. | 500 rev. | Sand | Gravel | Sand Equiv. | |
| **Irvington Gravel —Continued** | sand layers 5-10′ thick. Outcrop covers about a square mile and consists of a low range of hills which range from 75-200′ in elevation. | | | | | | | | | | | | | | | | | | |
| **Jacalitos Creek,** Fresno County, about 6 miles southeast of Coalinga | Stream bed deposit extends for several miles upstream from intersection with Highway 33; ranges from 200′ to 1000′ in width; at least 20′ deep. | Replenished in flood stage; little to no overburden; few percent plus 6″ present. Sub-angular to sub-rounded gravel. | Sandstone 37<br>Chert 20<br>Greenstone 13<br>Limestone 7<br>Serpentine 7<br>Diabase 7<br>Shale 6<br>Vein quartz 2<br>Conglomerate 1 | Division of Highways uses screened material (minus ¾″) for use in maintenance of roads; operate pit on royalty basis near Highway 33; pit is approx. 100′ long x 50′ wide x 10′ deep. | | | | | | | | | | | | | | | |
| **Kaweah River** Tulare County, near Lemon Cove | Stream bed and floodplain deposit extends for several miles below Terminus Dam. Average width of floodplain ½ mile; at least 35′ deep. Gravelly layers extend downstream in the floodplain but overburden becomes excessive. | No overburden in stream bed. Overburden in floodplain ranges from 8 to 20′. No replenishment. Near Lemon Cove—about 50% sand, with few percent plus 18″ boulders, and abundant plus 8″. Size decreases downstream to 8″ maximum at Visalia Sand Plant's Pit. Sub-rounded gravel. | Greenstone 43<br>Quartzite 24<br>Granitic Schist and gneiss 13<br>Gabbroic 8<br>Metavolcanic (acidic types) 6<br>Marble 5<br>(Data from USBR) 1 | Pacific Cement and Aggregates, Inc. 400 Alabama St. San Francisco SW¼ Sec. 35, T.17S., R. 27E., MDBM. About 1 mile north of Lemon Cove. | Excavate, with dragline, from floodplain to at least 10′ depth. Haul in bottom dump trucks about 2000′ to plant. | Reject plus 18″. Crush oversize in (2) primary jaw, (2) secondary cone crushers. Wash over standard vibrating screens, sand screw. | 250 tons per hour prepared; 120 tons per hour crushed | Concrete and bituminous sand and gravel, crusher run base | No. of tests | 10 | 10 | 10 | 10 | 5 | 5 | 9 | 6 | 10 | 10 |
| | | | | | | | | | Range of results | 2.61 to 2.66 | 2.64 to 2.79 | 0.9 to 1.7 | 0.7 to 1.2 | 5.4 to 8.0 | 21.0 to 30.4 | 2.0 to 4.6 | 0.7 to 3.3 | 83 to 96 | 1 |
| | | | | | | | | | Average 1957-60 | 2.63 | 2.73 | 1.3 | 0.9 | 6.6 | 26.7 | 3.6 | 2.1 | 90 | Satis. |
| | | | | Visalia Sand Plant P.O. Box 701 Visalia. NW¼ Sec. 4, T.18S., R. 27E., MDBM. About 2 miles northwest of Lemon Cove. | Excavates, with dragline, from floodplain-to maximum depth of 35′. Haul in end dump truck about 0.1 mile to plant. Overburden about 8′ increases to 18′ away from pit. | Simple screening plant. Wash over double deck screen (after scalping off plus 2½″), sand rake, and sand screw. | Small plant, est. 25 tons per hour gravel; 10 tons per hour sand | Concrete gravel, mortar, plaster sand | | | | | | | | | | | |
| **Kings River** Fresno County, near Sanger | Stream bed and adjacent floodplain deposit extends from Pine Flat Dam south for about 10 miles. Width ranges from 1,000′ at north end to about 1 | Overburden ranges from 0-8′, increasing on either side of the channel and downstream. Excessively bouldery above Hway 180 crossing; excessively | Granitic 71<br>Acidic metavolcanic 12<br>Greenstone 6<br>Quartzite 6<br>Gabbroic 3<br>Schist and gneiss 2<br>(Data from USBR) | Central Rock and Sand Co. P.O. Box 425 Sanger SW ¼ Sec. 19, T. 14 S., R. 23 E., MDBM. (plant). Pit in NE ¼ Sec. | Excavate with dragline to 10′ depth from pond (in flood plain) approx. 800′ long x 500′ wide. Haul in trucks approx. ½ mile to plant. | Crush oversize in jaw, 2 secondary cone crushers. Wash over standard vibratory screens, sand screw, cyclone. | 650 tons per day | Concrete sand and gravel | No. of tests | 2 | 4 | 2 | 4 | 1 | 1 | 2 | 2 | 2 | 2 |
| | | | | | | | | | Range of results | 2.63 2.63 | 2.61 to 2.65 | 0.8 1.1 | 0.9 to 1.1 | 7.2 | 29.0 | 2.1 3.3 | 1.6 0.5 | 91 90 | 1 |
| | | | | | | | | | Average 1957-59 | | 2.63 | | 1.0 | | | | | | Satis. |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | mile at south. Deposit contains gravelly layers at depth but cemented layer 8-20′ in depth prevents excavation. | sandy below Sanger. Gravel diminishes from abundant 12″ near the damsite, to few % plus 6″ near Sanger. Well-rounded gravel. | | 19. About 2 miles east of Sanger. | Approx. 10% plus 6″, 35% sand. Up to 8′ of overburden. | | | | | | | | | | | | | |
| | | | | Industrial Asphalt Inc. 3143 S. Hway 99, Fresno SE. ¼ Sec. 25, T. 14 S., R. 22 E., MDBM. About 2 miles southeast of Sanger. | Excavate with dragline below water table (from pit in floodplain) to about 25′ depth. Haul in end dump trucks short distance to plant. Large percentage of sand. About 8′ of overburden. | Crush oversize in primary jaw, 2 secondary cone crushers. Wash over standard vibrating screens; hydraulic sand tank and 2 dewatering screws. | 200 tons per hour | Concrete and bituminous sand and gravel | No. of tests | 2 | 7 | 4 | 7 | 4 | 4 | 4 | 7 | 4 | 4 |
| | | | | | | | | | Range of results | 2.65<br>2.64 | 2.60<br>to<br>2.64 | 1.0<br>to<br>1.3 | 0.8<br>to<br>1.2 | 7.6<br>to<br>10.0 | 28.6<br>to<br>32.4 | 2.5<br>to<br>4.3 | 1.6<br>to<br>6.7 | 93<br>to<br>99 | 1 2 |
| | | | | | | | | | Average 1959-62 | | 2 62 | 1.2 | 1.0 | 8.5 | 30.4 | 3.1 | 3.7 | 96 | Satis. |
| | | | | Sanger Rock and Sand 17125 E. Kings Canyon Rd. Sanger SE. ¼ Sec. 8, T. 14 S., R. 23 E., MDBM. About 5 miles northeast of Sanger. | Excavate to about 12′, in stream bed and adjacent floodplain, with dragline. Haul in end dump trucks about 0.1 mile to plant. No overburden; bottom on cemented layer. Abundant 8″ gravel. Deficient in fine sand. | Crush oversize in primary jaw, 3 secondary cone crushers. Wash over standard vibrating screens, dewater sand in sand paddlewheel. | 200 tons per hour | Concrete and bituminous sand and gravel, road base | No. of tests | 3 | 8 | 5 | 8 | 3 | 3 | 3 | 6 | 3 | 3 |
| | | | | | | | | | Range of results | 2.67<br>2.66<br>2.64 | 2.63<br>to<br>2.69 | 1.0<br>to<br>1.4 | 0.8<br>to<br>1.8 | 7.4<br>7.2<br>7.8 | 30.6<br>28.8<br>29.6 | 1.8<br>4.2<br>3.6 | 0.2<br>to<br>1.5 | 86<br>95<br>94 | 1 |
| | | | | | | | | | Average 1956-61 | | 2.65 | 1.2 | 0.9 | | | | 0.8 | | Satis. |
| **Lagunitas Creek,** Marin County, near Point Reyes Station | Stream bed deposit extends upstream for about 3 miles from its intersection with State route 1 (near Point Reyes Station) to its confluence with tributary Nicasio Creek. Narrow deposit, ranges from 100-200′ in width; at least 30′ deep. | No overburden. Replenished in flood stages. Maximum size 6″; greatest proportion minus 3″. Sub-angular to sub-rounded gravel. | Graywacke . . . . . 59<br>Chert . . 15<br>Vein quartz . 13<br>Meta volcanic 9<br>Schist . . . 3<br>Serpentine . . . . . 1 | Joslin Bros. Point Reyes Station About 3 miles east of Point Reyes Station. | Excavate with tractor shovel in stream bed to depths of 30′. | Wash in trommel screen. Discard oversize. Classify sand with 2 sand drags. | 30 tons per hour | Concrete sand and gravel | No. of Tests | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 |
| | | | | | | | | | Range of Results | 2.58 | 2.66<br>2.67 | 2.6 | 1.7<br>1.8 | 6.4 | 30.0 | 4.1 | 5.6<br>7.3 | 90 | 2 |
| | | | | | | | | | Average 1957 | | | | | | | | | | Satis. |
| **Little Panoche Creek,** Fresno County, near Mendota | Stream bed and floodplain deposit approx ½ mile long x ¼ mile wide x 6′ deep. | Slight overburden. No replenishment. Maximum size gravel 2½″. Abundant silt and sand. Sub-angular gravel. | Meta-graywacke . . . . . 42<br>Chert 22<br>Limy concretions . . . . . 10<br>Meta volcanic 9<br>Vein Quartz 9<br>Sandstone 5<br>Granitic 2<br>Schist . . . 1<br>(Data from USBR) | Used intermittently in past by Fresno County and private contractors as source of road base material. | | | | | | | | | | | | | | |

| DEPOSITS | | | | UTILIZATION | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Fixed Plant Operations | | | | | Laboratory Test Data | | | | | | | | | |
| | | | | | | | | | | Specific Gravity | | Absorption (percent) | | Abrasion (percent loss) | | Soundness (percent loss) | | | |
| Name and Location | Type and Extent | General Features | Rock Types (percent) | Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | | Sand | Gravel | Sand | Gravel | 100 rev. | 500 rev. | Sand | Gravel | Sand Equiv. | Organic Content |
| **Lone Pine Creek,** Inyo County, near Lone Pine | Alluvial fan deposit covers several square miles in vicinity of Lone Pine. At least 20′ deep. | Overburden ranges up to 10′ in depth. Where commercially developed, contains 70% sand and 30% gravel. Maximum size 2″. Angular gravel. | Granitic 79<br>Siliceous metavolcanic 12<br>Quartzite 5<br>Greenstone 4 | Lone Pine Sand and Gravel Co.<br>P.O. Box 363<br>Lone Pine<br>NE ¼ Sec. 20, T. 15 S., R. 36 E., MDBM.<br>About 1 mile north of Lone Pine. | Excavate with front end loader from circular pit, approx. 300′ in diameter, to depth of about 20′. | Scalp off oversize over vibrating screen. Crush in small jaw crusher. | Estimate 25 tons per hour | Concrete sand and gravel | No. of Tests | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 |
| | | | | | | | | | Range of Results | 2.63 | 2.62 | 0.5 | 1.2 | 9.0 | 33.4 | 0.7 | 2.2 | | 1 |
| | | | | | | | | | Average | | | | | | | | | | Satis. |
| **Los Banos Creek,** Merced County, near Los Banos | Stream bed deposit extends for about 3 miles upstream from the Delta Mendota Canal. Average width 500′; thickness of gravelly layers about 25′ above clay strata about 20′ thick. Sand and gravel also occur upstream in Los Banos Valley in stream bed for about 4 miles, with a maximum width of 2,000′. | Some replenishment in flood stage; maximum size ranges from 12″ near foothills to 6″ downstream near gravel plants; overburden ranges from 0-3′ of silty sand. Gravel is subrounded to subangular. | Quien Sabe volcanic rocks-rhyolite, andesite, basalt 39<br>Graywacke 37<br>Chert .9<br>Metavolcanic (greenstone) 7<br>Vein quartz 6<br>Granitic 1<br>Schist <1<br>Siltstone <1 | Los Banos Mining Co.<br>P.O. Box 1111.<br>Los Banos;<br>NE ¼ Sec. 32, T. 10 S., R. 10 E., MDBM.<br>About 4 miles southwest of Los Banos. | Excavates with diesel shovel in dry pit about 500′ wide, to 25′ depth; haul about 2,000′ to plant in end dump truck. Deposit deficient in sand. | Feed goes thru grizzly to primary jaw which crushes plus 1″ and then to secondary cone crusher; sand classified in two screws; rewash gravel over bins in scrubber-trommel. | 40 tons per hour prepared gravel; 20 tons per hour washed sand | Concrete sand and gravel, road base | No. of tests | 3 | 7 | 3 | 7 | 3 | 3 | 2 | 6 | 5 | 1 |
| | | | | | | | | | Range of results | 2.59<br>2.61<br>2.61 | 2.59<br>to<br>2.61 | 1.9<br>2.0<br>2.2 | 2.1<br>to<br>2.5 | 4.8<br>4.8<br>5.2 | 23.2<br>23.6<br>24.6 | 4.5<br>5.7 | 3.1<br>to<br>5.6 | 62<br>to<br>80 | 1 |
| | | | | | | | | | Average 1955 | | 2.60 | | 2.3 | | | 5.1 | 5.1 | 73 | Satis. |
| | | | | Merced County (?) or Freeman owns pit upstream from which contractors (i.e. Ball, Baldwin) intermittently remove material with portable crushing equipment. | | | | | | | | | | | | | | | |
| | | | | Granite Const. Co. has a semi-portable plant set up at mouth of canyon in Sec. 7, T. 11 S., R. 10 E., MDBM, to process material as needed on nearby construction jobs; operate intermittently. | | | | | | | | | | | | | | | |
| **Los Gatos Creek,** Fresno County, near Coalinga | Alluvial fan deposit of Los Gatos Creek extends for about 3 miles downstream from mouth of canyon. About 1 mile wide near Coalinga, narrowing toward head of fan. Gravel depth in wells is about 150′. Interbedded sandy lenses up to 3′ thick present. | Slight replenishment in flood stage. Overburden ranges from 1-3′, of silty sand. Few percent of plus 4″ present. Subangular to subrounded gravel. | Serpentine 27<br>Sandstone 26<br>Volcanic (Keratophyre) 11<br>Metachert 10<br>Quartzite 8<br>Chert .6<br>Limestone 5<br>Granitic 4<br>Greenstone 2<br>Schist 1<br>Conglomerate <1 | L. D. Folsom, Inc.<br>P.O. Box 347<br>Coalinga<br>SE ¼ Sec. 20, T. 20 S., R. 15 E., MDBM.<br>About 1 mile north of Coalinga. | Excavate with diesel shovel from pit approx. 1,000′ long x 500′ wide x 30′ deep. Haul short distance to plant. Caliche coatings on pebbles encountered at surface and at 25′ depth, limit pit operation. | Primary jaw, secondary cone crushers. Wash over standard vibrating screens; sand screw. | 200 tons per hour | Concrete and bituminous sand and gravel, road base | No. of tests | 3 | 4 | 3 | 4 | 2 | 2 | 2 | 4 | 3 | 2 |
| | | | | | | | | | Range of results | 2.58<br>2.60<br>2.60 | 2.60<br>to<br>2.62 | 2.3<br>2.3<br>2.1 | 1.1<br>to<br>1.7 | 4.2<br>4.2 | 21.8<br>20.4 | 5.4<br>3.8 | 3.1<br>to<br>8.0 | 72<br>79<br>69 | 1<br>1 |
| | | | | | | | | | Average 1959-62 | | 2.61 | | 1.5 | | | | 5.7 | | Satis. |
| | Sand and gravel also occur in the stream bed of Los Gatos Creek at head of fan and extends upstream for about 3 miles. Average width 250′. | Some replenishment. Little or no overburden. Few percent of plus 6″ present. | As above | None | | | | | | | | | | | | | | | |

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| | Shallow, narrow, deposit. | | | | | | | | | | | | | | | | | | | | |
| **Los Gatos Creek,** Santa Clara County, near Los Gatos | Stream bed deposit extends from Campbell to Los Gatos (about 4 miles). Width of deposit ranges from 100-1500 feet; at least 20′ deep. | As much as 3′ of overburden. No replenishment. About 30% plus 2″; 8″ maximum, some 2′ boulders present. Sub-rounded gravel. | Graywacke 78<br>Metavolcanic 13<br>Granitic 5<br>Chert 2<br>Schist 1<br>Serpentine 1 | Reed and Graham, Inc., 690 Sunol St., San Jose, are excavating with tractor-pulled scrapers in the NE¼ Sec. 3, T.8S., R.1W., MDBM. Produce road base and fil lin a dry, portable crushing plant while preparing percolation ponds in the stream bed for the Santa Clara County water district. Commercial plants have ceased operations. | | | | | No. of tests | | 1 | | 1 | 1 | 1 | | 1 | | |
| | | | | | | | | | Range of results | | 2.63 | | 2.1 | 8.2 | 29.2 | | 10.4 | | |
| | | | | | | | | | Average 1954 | | | | | | | | | | |
| **Mariposa Creek,** Mariposa County, near Mariposa | Dredge tailings occur along Mariposa Creek for about 3000′ commencing at a point about 1.1 miles south of Mariposa. Tailings are 100-300′ wide and 12-15′ deep. | Little overburden. No replenishment. Abundant plus 2″, maximum size 10″, some 2′ boulders present. Sub-angular to sub-rounded gravel. | Metabasic igneous and porphyritic volcanic 78<br>Greenstone 11<br>Quartzite 5<br>Serpentine 4<br>Quartz 2 | Mariposa Sand and Gravel Co. P.O. Box N Mariposa SW¼, Sec. 36, T.5S., R.18E., MDBM. About 1½ miles south of Mariposa. | Excavate with dragline to depths of 15′. Haul short distance to plant. Obtain sand from pit on Chowchilla Creek. Also have pit on Merced R. in NE¼, Sec. 18, T.3S., R.20E., where operate portable crushing plant. | Crush oversize in primary jaw, secondary cone crushers. Wash in trommel and over screens; sand screw. | 400 tons per day | Concrete sand and gravel, road base | No. of tests | 2 | 4 | 2 | 4 | 2 | 2 | 1 | 2 | 2 | 1 |
| | | | | | | | | | Range of results | 2.76<br>2.76 | 2.80 to 2.86 | 2.8<br>2.6 | 0.8 to 1.7 | 3.8<br>3.6 | 17.4<br>17.4 | 4.7 | 1.6<br>1.3 | 86<br>84 | |
| | | | | | | | | | Average 1956-57 | | 2.85 | | 1.2 | | | | | | Satis. |
| **Mariposa Creek,** Merced County, near Le Grand | Dredge tailings extend for about 3 miles from Mariposa reservoir to a point 1 mile west of the Mariposa County line. In Merced County, the tailings are about 100′ wide x 15′ thick near the present channel. Deficient in very fine sand. | No overburden in stream channel; dry; abundant plus 2″, with 6″ maximum. No replenishment. Sub-angular to sub-rounded gravel. | Metabasic igneous (incl. volcanic porphyry) 43<br>Hornfels 32<br>Granitic 12<br>Slate 8<br>Metarhyolite 2<br>Quartz 2<br>Gneiss <1<br>Amphibolite <1<br>Greenstone <1 | Le Grand Sand and Gravel P.O. Box 232 Le Grand SW¼, Sec. 2, T.8S., R.16E., MDBM. About 3 miles northeast of Le Grand. | Excavate with dragline to about 8′ depth. Truck short distance to plant. | Crush oversize in gyratory, jaw, and roll crushers. Wash over trommel screens; dewater with sand rake. | 60-100 tons per hour | Concrete sand and gravel, road base | | | | | | | | | | | | |
| **Merced River,** Merced County, north of Merced | Stream bed and adjacent floodplain deposits extend for about 10 miles from Snelling to Cressey. The stream channel deposits are narrow, ranging from 100-250′ wide. Gravels are shallow, ranging in depth from about 7′ near Snelling, to about 22′ near Cressey. Gravels overlie either a clay layer or cemented gravel. | No replenishment. Floodplain deposits are overlain by overburden 5-15′ thick which increases laterally away from the river, and downstream. No overburden on gravel bars upstream. Maximum size 8″ near Snelling decreases to 6″ near Cressey. Sub-rounded gravel. | Quartzitic metasedimentary 39<br>Metachert 22<br>Quartz 8<br>Metaargillite 8<br>Metavolcanic (basic) 6<br>Quartzite 5<br>Metavolcanic (acidic) 5<br>Granitic 3<br>Chert 3<br>Serpentine 1 | Cressey Sand and Gravel Plant Route 2, Box 360 Merced NE¼ Sec. 8, T. 6 N., R. 12 E., MDBM. About ½ mile northwest of Cressey. | Excavates with floating suction pump from stream bed to depths of 35′. Pumps only plus 4″ to plant about 100′ away. Overburden on adjacent floodplain (about 10′ of sand) overlies gravelly strata. | Slurry passes over vibrating screens, scalp off plus 1″. Screen sand, and dewater it in sand drag. | 50 tons per hour | Concrete, sand and gravel, plaster sand | | | | | | | | | | | | |
| | | | | River Rock, Inc. 20 E. 15th St. Modesto SE¼ Sec. 26, T. 5 S., R. 13 E., MDBM. About 2 miles southwest of Snelling. | Excavate with dragline from stream bed to 4-7′. Haul in end dump trucks about 0.3 miles to plant. Maximum size to 8″, some boulders up to 12″ present. | Crush oversize in primary jaw, secondary cone crushers. Use roll crusher for screenings for hot mix. Wash over standard vibrating screens, dewater with sand drag. | 200 tons per hour | Concrete and bituminous sand and gravel, road base | No. of Tests | 6 | 10 | 6 | 10 | 10 | 10 | 5 | 10 | 8 | 4 |
| | | | | | | | | | Range of Results | 2.64 to 2.71 | 2.67 to 2.73 | 1.0 to 1.5 | 0.7 to 1.5 | 3.6 to 5.0 | 19.2 to 22.8 | 1.8 to 4.6 | 1.4 to 4.0 | 88 to 97 | 1 |
| | | | | | | | | | Average 1960-61 | 2.67 | 2.71 | 1.2 | 1.1 | 4.2 | 21.1 | 3.3 | 2.3 | 93 | Satis. |

| DEPOSITS | | | | UTILIZATION | | | | | | | | | | | | | | | | |
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| | | | | Fixed Plant Operations | | | | | Laboratory Test Data | | | | | | | | | | | |
| | | | | | | | | | | Specific Gravity | | Absorption (percent) | | Abrasion (percent loss) | | Soundness (percent loss) | | | |
| Name and Location | Type and Extent | General Features | Rock Types (percent) | Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | | Sand | Gravel | Sand | Gravel | 100 rev. | 500 rev. | Sand | Gravel | Sand Equiv. | Organic Content |
| Merced River Continued | | | | | | Have portable plant 1 mile west to produce road base. | | | | | | | | | | | | | | |
| | | | | Turlock Rock Co. P.O. Box 548 Turlock NW ¼ Sec. 8, T. 6 S., R. 12 E., MDBM. About ½ mile northwest of Cressey. | Excavate with floating suction pump from streambed. Work to about 22′ depth where gravel becomes coarser (plus 6″). Pump minus 6″ to nearby plant where sand is screened out and flumed back to river bed. Slackline cableway then excavates the sand as needed and returns sand to plant. Overburden on adjacent floodplain is 15′ of sand. | Crush plus 1½″ in primary and secondary cone crushers. Wash over standard vibrating screens. Dewater sand in sand drag. | 300-400 cubic yards per day | Concrete sand and gravel, road base | | | | | | | | | | | | | |
| | | | | Valley Aggregates, Inc. 625 J St. Merced NE¼ Sec. 3, T. 6 S., R. 12 E., MDBM. About 2 miles northeast of Cressey. | Excavate with drag line from stream bed and adjacent floodplain to about 22′ depth. Bottom on clay layer. About 5′ of overburden which increases away from stream channel. Maximum size 8″; abundant plus 4″, about 60% gravel | Crush oversize in primary jaw and 2 secondary cone crushers. Wash over standard vibrating screens. Dewater in sand drag. | 250 cubic yards per day | Concrete sand and gravel, road base | No. of Tests | 3 | 6 | 3 | 6 | 2 | 2 | 2 | 4 | 3 | 1 |
| | | | | | | | | | Range of Results | 2.61 to 2.63 | 2.63 to 2.67 | 1.5 to 1.2 | 0.8 to 1.1 | 5.4 to 6.0 | 25.2 to 27.4 | 2.6 to 2.7 | 0.8 to 3.8 | 91 to 95 | |
| | | | | | | | | | Average 1955-58 | | 2.65 | | 1.0 | | | | 1.8 | | Satis. |
| | Dredge tailings approx. 30′ high x ¼ to 1 mile wide x 9 miles long extend upstream from the vicinity of Snelling to the Mariposa County line. | No overburden. Maximum size gravel 12″. | Lithology similar to that of stream bed deposit. | None | | | | | | | | | | | | | | | | |

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| **Merced River,** Mariposa County, near El Portal | Stream bed deposit extends for several miles downstream from El Portal. Deposit ranges up to 300′ in maximum width. At least 10′ deep. | No overburden. Replenished in flood stages. Abundant cobbles and boulders which increase in size upstream. Maximum size 8″, abundant plus 8″. Sub-rounded gravel. | | Mariposa Sand and Gravel Co. operates a portable crushing plant in NE¼ Sec. 18, T. 3 S., R. 20 E., MDBM., about 1½ miles downstream from El Portal. Produce road base for use on state highways and in Yosemite National Park. | | | | | | | | | | | | | | |
| **Mokelumne River,** San Joaquin County, near Clements | Dredge tailings extend from Clements to Camanche a distance of approximately 9 miles, adjacent to the Mokelumne river; width ranges from 200-2,000′, about 30′ thick, above water table. | No overburden, no replenishment. Maximum size 6″. Sub-rounded gravel. | Quartzitic metasedimentary 20–40<br>Greenstone 20–30<br>Vein quartz 10–25<br>Granitic 2–10<br>Tertiary volcanic 2–7<br>Schist . . 1<br>(Calif. Jour. Mines and Geol., Jan. 1955, p. 61) | Claude C. Wood Co. P.O. Box 599, Lodi SE¼ Sec. 16, T. 4 N., R. 8 E., MDBM. About 1 mile west of Clements. | Excavates with dragline to water table at 25′ depth; haul in 2 bottom dump trucks about 3 miles to plant; dig behind levee next to stream bed. | Scalp off plus 4″, plus 1½ to 4″ goes to 4′ cone crusher for hot mix; minus 1½″ goes to log washer, then washed over screens; minus 4″ feed goes thru scrubber-trommel screen. Dry plant is separate-fed directly from pit for crusher run base; consists of primary jaw and 2 secondary cone crushers. Sand washed in screw-type classifier. Second smaller screw used for plaster sand. | 1,200 tons per 8 hours | Concrete and bituminous sand and gravel, road base, cobbles, plaster sand | No. of tests | 7 | 10 | 7 | 10 | 5 | 5 | 6 | 10 | 7 | 6 |
| | | | | | | | | | Range of results | 2.59 to 2.64 | 2.67 to 2.74 | 1.6 to 2.1 | 0.5 to 1.4 | 4.8 to 6.4 | 23.0 to 26.8 | 3.4 to 4.8 | 0.1 to 6.3 | 83 to 94 | 1 3 |
| | | | | | | | | | Average 1957-61 | 2.62 | 2.69 | 1.8 | 1.1 | 5.4 | 24.6 | 4.0 | 2.9 | 88 | Satis. |
| | | | | Teichert Aggregates operates a semi-portable plant in SW ¼ Sec. 11, T. 11 N., R. 8 E., about 1½ mile northeast of Clements to produce bituminous aggregate and road base from the dredge tailings. | | | | | | | | | | | | | | | |
| **Monterey Bay Beach and Dune Sand,** Monterey County, near Monterey | Present beach and Quaternary dune sands extend for about 10 miles from a mile south of the Salinas River to the city of Monterey. Dunes range up to 200′ above sea level and from 200 yards to half mile in width. Average width 0.25 mile; average height 50′. | Dune sands mostly stabilized; little brush overburden, negligible soil cover; mostly unacemented, medium, well-sorted, sub-angular to sub-rounded sand. Beach sands are a well-sorted, subrounded to well-rounded, polished, coarse sand; replenished locally. | Predominantly quartz, feldspar, and mica | Granite Const. Co. P.O. Box 900, Watsonville. SW ¼ Sec. 15 (proj.), T. 15S., R. 1E., MDBM. About 1 mile north of Seaside. | Excavate with drag scraper from beneath surf, and from surface of nearby dunes. Build up surge pile over reclaiming tunnel. | Vibrating feeder loads sand onto conveyor belt, thence to vibrating screen and into bunker. Plus No. 4 is wasted. | Estimated 100 tons per hour | Concrete and bituminous sand | No. of tests | 2 | | 2 | | | | 2 | | 2 | 2 |
| | | | | | | | | | Range of results | 2.58 2.59 | | 0.5 0.6 | | | | 3.0 1.7 | | 100 100 | 1 |
| | | | | | | | | | Average 1959-61 | | | | | | | | | | Satis. |
| | | | | Monterey Sand Co. Box 928, Monterey. Marina Plant. SE¼ Sec. 24 (proj.), T. 14 S., R. 1 E., MDBM. About 1 mile northwest of Marina. | Excavate from beach and dunes with dragscraper. Stockpile over reclaiming tunnel. | Convey sand to standard vibrating screens and wash. Plus ⅜″ is scalped and wasted. Minus ⅜″ goes to funnel-type hydraulic classifier tanks, sand wheel dewaterers and bins. Truck about ¼ mile to drying and screening | Estimate about 40 tons per hour of washed and dried sand | Blast, concrete, engine, plaster sands; roofing granules | | | | | | | | | | |

| DEPOSITS | | | | UTILIZATION | | | | | | | | | | | | | | | | |
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| | | | | Fixed Plant Operations | | | | | Laboratory Test Data | | | | | | | | | | | |
| | | | | | | | | | | Specific Gravity | | Absorption (percent) | | Abrasion (percent loss) | | Soundness (percent loss) | | | |
| Name and Location | Type and Extent | General Features | Rock Types (percent) | Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | | Sand | Gravel | Sand | Gravel | 100 rev. | 500 rev. | Sand | Gravel | Sand Equiv. | Organic Content |
| Monterey Bay Beach and Dune Sand —Continued | | | | | | plant. Feed drying plant with bucket elevator. Plant consists of gas fired rotary kiln, standard vibratory screens, Store in bins and recombine to specification. | | | | | | | | | | | | | | |
| | | | | Monterey Sand Co. P.O. Box 928 Monterey SW¼ Sec. 15 (proj.), T. 15 S., R. 1 E., MDBM. In Seaside. | Excavate sand from the surf and dunes with drag scraper. Stockpile over reclaiming tunnel. | Wash over ½ inch screen. Oversize is scalped and wasted. Minus ½" goes to an hydraulic classifier tank and sand wheel dewaterers, and stored in bins. Truck sand to drying plant about ⅔ mile to south. Bucket elevator feeds plant which consists of gas fired rotary kiln and standard vibrating screens. Store in bins and recombine to specification. | 80 tons per 8 hours. | Blast, engine, stucco, filter, sand; roofing granule and aquarium gravel | No. of tests | 10 | | 10 | | | | 5 | | 10 | 6 |
| | | | | | | | | | Range of results | 2.56 to 2.60 | | 0.4 to 1.0 | | | | 0.4 to 3.0 | | ¾ to 100 | 1−1+ |
| | | | | | | | | | Average 1955-61 | 2.59 | | 0.8 | | | | 1.6 | | 97.7 | Satis. |
| | | | | Pacific Cement and Aggregates, Inc. Lapis Plant, 400 Alabama St. San Francisco E½ Sec. 13 (proj.), T. 14 S., R. 1 E., MDBM. About 2 miles north of Marina. | Excavate with floating suction dredge from circular pit in dunes approx. 400′ in width, to about 30 feet below water table. Pump slurry to plant. Top 20′ of fine-medium sand, overlies about 30′ of coarser, possibly older, beach sand. | Scalp off plus 6 mesh and store. Minus No. 4 goes to Dorr-Oliver jet sizer and then to two spiral classifiers, and stockpile. Haul in front-end shovel loader to drying and screening plant which consists of a gas-fired rotary kiln (to dry the sand), and 9 circular vibrating screens, from which the sand | Dried processed sand: 40 tons per hour | Blast and other specialty sands, and plaster sand | No. of tests | 2 | | 2 | | | | 1 | | 2 | 2 |
| | | | | | | | | | Range of results | 2.59 2.59 | | 1.0 0.9 | | | | 1.9 | | 96 90 | 1 |
| | | | | | | | | | Average 1961 | | | | | | | | | | Satis. |

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| | | | | | | fractions go into separate bins and are recombined on a blending belt. | | | | | | | | | | | | | | |
| | | | | Pacific Cement and Aggregates, Inc. Pratteo Plant 400 Alabama St. San Francisco N½ Sec. 15, T. 15 S., R. 1 E., MDBM. About 1 mile north of Seaside. | Excavate from surf and dunes with drag scraper. Stockpile above vibrating feeder. | Simple screening plant. Scalp off plus No. 4 over vibrating screen. | Estimate about 50 tons per hour | Concrete, plaster, blast sand | | | | | | | | | | | |
| | | | | Seaside Sand and Gravel P.O. Box 513 Marina. NE¼ Sec. 24 (proj.), T. 14 S., R. 1 E., MDBM. About 1 mile northwest of Marina. | Excavate from surf with drag scraper, stockpile over reclaiming tunnel. | Convey to a washing and screening plant. Scalp off plus ½" and wash over standard vibrating screen, and rake classifier. Stockpile over reclaiming tunnel which feeds drying and screening plant. Latter plant consists of rotary kiln and standard vibrating screens. | Estimate about 25 tons per hour | Blast, plaster and concrete sand, roofing granules | | | | | | | | | | |
| **Monterey Peninsula Dune Sand** Monterey County, near Pacific Grove | Sand dunes occur in two distinct areas on the west side of the Monterey Peninsula. One, due west of Pacific Grove is approx. 1½ miles long by about ½ mile wide. The other deposit, southwest of Pacific Grove covers an irregular area of about ¼ sq. mile. The dunes range from a few feet to about 30′ in depth. | No replenishment. Compacted, uncemented, crudely stratified; well-sorted, medium, sub-angular sand. | Nearly equal parts of quartz, and feldspar with minor amounts of biotite and and heavy minerals. | Del Monte Properties 620 Market St. San Francisco Pit in SE¼ Sec. 33, T.15S., R.1W., MDBM. About 4 miles southwest of Pacific Grove. | Excavate with clamshell. Truck in end dump trucks about 3 miles to plant. | Scalp off plus ⅜". Scrub sand in attrition cells, dewater in screw classifier, treat with flotation reagents, dewater and dry. | | Stucco and plaster sand, glass sand | | | | | | | | | | | |
| **Moore Creek,** Mariposa County, near Buck Meadow | Reworked hydraulic mining debris extends along Moore Creek for about 1 mile to the south of its intersection with State Hway 49. Deposit is about 100′ wide and at least 10′ deep. | Little to no overburden. Replenished in streambed during flood stage. Maximum size gravel 6"; few percent plus 6". Excess of sand—about 65% sand. | Quartzitic metasedimentary .62<br>Metachert .23<br>Metavolcanic..... 5<br>Quartzitic.. 4<br>Mica schist 3<br>Quartz..... 2<br>Aplite..... 1 | Kenneth Henly Groveland SE¼ Sec. 35, T.1S., R17E., MDBM. About 1 mile South of Buck Meadow. | Excavate to 10′ depth with front end shovel loader, which hauls short distance to plant. | Crush oversize in jaw crusher, wash over screen; 2 sand drags, sand screw. | 10 tons per hour | Concrete sand and gravel, road base | No. of tests | 1 | 2 | 1 | 2 | 1 | 1 | 2 | | 1 |
| | | | | | | | | | Range of results | 2.58 | 2.53<br>2.53 | 2.2 | 2.0<br>2.5 | 14.6 | 48.4 | 9.7<br>11.6 | | 2 |
| | | | | | | | | | Average 1960 | | | | | | | | | Satis. |

| DEPOSITS | | | | UTILIZATION | | | | | | | | | | | | | | |
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| | | | | Fixed Plant Operations | | | | | Laboratory Test Data | | | | | | | | | |
| | | | | | | | | | | Specific Gravity | | Absorption (percent) | | Abrasion (percent loss) | | Soundness (percent loss) | | | |
| Name and Location | Type and Extent | General Features | Rock Types (percent) | Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | | Sand | Gravel | Sand | Gravel | 100 rev. | 500 rev. | Sand | Gravel | Sand Equiv. | Organic Content |
| **Nacimiento River,** Monterey County, west of Jolon | Stream bed deposits along upper reaches of Nacimiento River, and smaller bars, extend for about 20 miles downstream to vicinity of Nacimiento Dam. Narrow deposit—about 50′ wide at head, approx. 1000′ wide, 7 miles downstream. | No overburden; replenished in flood stage. Abundant 3-6″ gravel, near tributary San Miguel Ck., diminishes downstream; abundant 3″-4″, 7 miles downstream. Subangular to subrounded gravel. | Pegmatitic 31<br>Sandstone 26<br>Gneissic 15<br>Granitic 12<br>Calc-silicate hornfels 6<br>Quartzite 5<br>Greenstone 3<br>Serpentine 1<br>Porphyry 1 | None | | | | | No. of tests | 3 | 8 | 3 | 8 | 5 | 5 | 3 | 10 | 3 | 3 |
| | | | | | | | | | Range of results | 2.56<br>2.58<br>2.60 | 2.58<br>to<br>2.61 | 1.6<br>1.3<br>1.5 | 1.4<br>to<br>2.1 | 6.8<br>to<br>8.0 | 30.2<br>to<br>32.4 | 3.8<br>5.9<br>5.4 | 6.3<br>to<br>12.4 | 85<br>75<br>89 | 2 |
| | | | | | | | | | Average 1954 | | 2.60 | | 1.7 | 7.5 | 31.1 | | 8.8 | | Satis. |
| **Novato Conglomerate,** Marin County, near Novato | Novato Conglomerate, of Cretaceous age, covers a crudely rectangular area about 0.8 miles wide x 3 miles long, near Petaluma Creek. The conglomerate contains some well-cemented portions, and sandstone interbeds 1′-3′ thick. Deposit, where exposed, is over 100′ deep. | Little overburden, dry deposit. Gravel fraction contains clay balls which dessicate upon exposure to air. Maximum size gravel 3″, with a few percent of boulders up to 1′ in diameter. Matrix, locally cemented, contains silt and clay. Many of the pebbles, which show post-depositional weathering effects, are fractured and crumbly. Subangular to subrounded gravel. | Clay (altered tuff) 22<br>Chert 22<br>Acid volcanic 21<br>Silicified volcanic 17<br>Shale 8<br>Quartz 5<br>Siltstone 4<br>Aplite 1 | Black Point Aggregates (Niles Sand and Gravel Co., Inc.) P.O. Box 248, Niles SE. ¼ Sec. 15 (proj.), T. 3 N., R. 6 W., MDBM. About 3 miles due east of Novato. | Excavate with tractor equipped with hydraulic ripper. Tractor pushes material about 500′ to plant. | Wash in revolving scrubber; crush in jaw crusher; standard vibrating screens. Sand screw-type classifiers; attrition machine, cyclone. | (Plant idle since 1960) | Road base, fill | | | | | | | | | | | |
| **Orestimba Creek,** Stanislaus County, near Newman | Floodplain-alluvial fan deposit extends from a point about 3 miles west of Hiway 33 upstream for about 4 miles; width ranges from 500-1,500′; gravel reported from well 100′ deep near Marks' plant. | Some replenishment. Maximum size 8″—small percentage of 3-8″. No overburden. Subangular to subrounded gravel. | Sandstone 70<br>Vein quartz 8<br>Siltstone 7<br>Chert 5<br>Serpentine 5<br>Schist 3<br>Metavolcanic 2 | Frank B. Marks, Jr. P.O. Box 668, Newman. SE. ¼ Sec. 9, T. 7 S., R. 8 E., MDBM. About 3½ miles northwest of Newman. | Excavate with front-end loader to 8′ depths; haul in end dump trucks short distance to plant; dry pit worked intermittently. | Two separate processing plants: screening plant for concrete aggregate consists of standard vibrating screens and sand wheel; wash over screens. Plus 2½″, which is scalped off, is stockpiled for portable crusher, which consists of a | 150 tons per hour washed aggregate | Concrete sand and gravel, road base | No. of tests | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 |
| | | | | | | | | | Range of results | 2.59 | 2.62<br>2.64 | 1.7 | 1.2<br>1.2 | 5.0 | 26.4 | 2.6 | 0.8<br>1.2 | 92 | 1 |
| | | | | | | | | | Average 1958 | | | | | | | | | | Satis. |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | jaw and roll crusher. | | | | | | | | | | | | |
| **Owens River,** Inyo County, near Bishop | Floodplain and terrace deposit extends for several miles north of Bishop. Floodplain deposits range up to 500′ in width and are at least 10′ deep. | Overburden ranges from 1′ on floodplain, to 10′ on terrace deposits. No replenishment. Maximum size 5″. Abundant plus 1½″. Subrounded gravel. | Granitic 75<br>Quartzitic metasedimentary rocks 9–17<br>Quartzite 5–10<br>Andesite-basalt 2–6<br>Rhyolite 1 | Bishop Engineering and Const., Inc. P.O. Box 505 Bishop. NE ¼ Sec. 24, T. 6 S., R. 32 E., MDBM. About 3½ miles north of Bishop. | Excavate with tractor-dozer which pushes material to plant. Work to water table at about 4′. | Wash over standard vibrating screens; trommel. Crush oversize in two portable jaw crushers. | About 400 tons per day | Concrete sand and gravel, road base | No. of tests | 5 | 6 | 4 | 4 | 2 | 2 | 2 | 4 | | 4 |
| | | | | | | | | | Range of results | 2.54 to 2.64 | 2.59 to 2.66 | 1.5 to 1.9 | 0.7 to 0.8 | 4.6 to 5.1 | 25.4 to 26.9 | 2.1 to 2.0 | 0.6 to 1.4 | | 1+ 2 |
| | | | | | | | | | Average 1952-54 | 2.57 | 2.63 | 1.8 | 0.7 | | | | 1.1 | | Satis. |
| | | | | Hiatt's Sand and Gravel Co. 362 E. Clarke St. Bishop SE ¼ Sec. 28, T. 6 S., R. 33 E., MDBM. About 2 miles northeast of Bishop. | Excavate with front end shovel loader. Haul in end dump trucks about 500′ to plant. Pit has 6′–8′ of overburden that overlies 6′–8′ of sand and gravel. About 4″ maximum size gravel. | Crush oversize in jaw crusher. Screen over bins with standard vibrating screens. | About 40 cubic yards per hour | Concrete sand and gravel | No. of tests | 3 | 6 | 1 | 2 | 3 | 3 | 3 | 6 | 1 | 1 |
| | | | | | | | | | Range of results | 2.65<br>2.64<br>2.57 | 2.58<br>to<br>2.63 | 1.5 | 0.8<br>0.9 | 6.0<br>5.6<br>6.2 | 30.6<br>29.3<br>31.0 | 2.0<br>1.2<br>1.1 | 0.4<br>to<br>1.1 | 82 | 1 |
| | | | | | | | | | Average 1949-58 | | 2.61 | | | | | | 0.7 | | Satis. |
| **Pacheco Creek,** Santa Clara County, approx. 15 miles northeast of Hollister | Stream bed deposit extends for about 6 miles downstream from intersection with north fork; width ranges from 100-1,000′, shallow deposit. | Replenished in flood stages; little or no overburden. Maximum size 6″ diminishes downstream. Subangular to subrounded gravel. | Metagraywacke 63<br>Schist 21<br>Vein quartz 8<br>Basaltic 7<br>Chert 1 | Used by Division of Highways in maintenance of roads for base and asphaltic surfacing from pit near Bell station; used for concrete aggregate in construction of dam on North Fork. | | | | | No. of tests | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 |
| | | | | | | | | | Range of results | 2.59<br>2.58<br>2.60* | 2.64<br>2.63<br>2.64* | 2.0<br>2.0<br>2.2* | 1.6<br>1.7<br>1.7* | 6.5<br>6.8<br>7.0* | 31.4<br>31.7<br>32.0* | 3.9<br>5.0<br>6.6* | 3.2<br>4.5<br>12.8* | 80<br>82<br>84* | 2+<br>2+<br>1+<br>2* |
| | | | | | | | | | Average | | | | | | | | | | Satis |
| | | | | | | | | | *Sample taken from O'Connell property (1959); other data from E. H. Sharp pit. (1954). | | | | | | | | | | |
| **Panoche Creek,** Fresno County, about 20 miles southwest of Mendota | Stream bed deposit extends for about 3 miles downstream from confluence with Silver Creek to edge of valley. Width ranges from 200′-800′; shallow deposit. | Little or no overburden; some replenishment; average maximum size about 3″, some larger boulders present. Excess of sand over gravel. Subangular to subrounded gravel. | Sandstone 35<br>Serpentinized peridotite 17<br>Siltstone 10<br>Schist 9<br>Limestone 8<br>Vein quartz 5<br>Silica carbonate rock 4<br>Chert 3<br>Greenstone 2<br>Limonite nodule 2<br>Calcite 2<br>Volcanic rock 2<br>Agate 1 | Granite Const. Co. intermittently operates a semi-portable plant in NW ¼, Sec. 15, T. 15 S., R. 12 E. Have hot mix plant near gravel plant. Excavate in stream bed to 8′ depth. Presumbaly have screened off oversize gravel to crush for hot plant. | | | | | | | | | | | | | | |
| **Putah Creek,** Napa County, west of Winters | Stream bed deposit extends about 4 miles upstream from Winters. Average width about 750′; at least 40′ deep. | Little to no overburden. No replenishment since Monticello dam built. Maximum size 6″, abundant plus 1½″ Sub-angular to subrounded gravel | Serpentinite 13-27<br>Volcanic rocks: basalt 4-16 andesite 6 dacite-rhyolite 8-11<br>Sandstone 12-23<br>Metasandstone 8-23 | Frederickson Bros. 1259 65 St. Emeryville NE ¼ Sec. 28, (proj.), T. 8 N., R. 1 W., MDBM. About ¼ mile south of Winters. | Excavate above water table to 5′ depth with self-propelled scrapers; haul short distance to plant. | Semi-portable plant. Crush and screen dry. | 800 tons per day | Bituminous sand and gravel | No. of Tests | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 |
| | | | | | | | | | Range of Results | 2.58 | 2.61 | 3.2 | 2.5 | 6.0 | 25.8 | 10.8 | 6.8 | | |
| | | | | | | | | | Average 1960 | | | | | | | | | | Satis |
| | | | | | | | | | | Sample from undeveloped source | | | | | | | | | |
| | | | | Madison Sand | Excavate with | Screening and | 200 tons per | Bituminous | | | | | | | | | | | |

| DEPOSITS | | | | UTILIZATION | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Fixed Plant Operations | | | | | Laboratory Test Data | | | | | | | | | | |
| | | | | | | | | | | Specific Gravity | | Absorption (percent) | | Abrasion (percent loss) | | Soundness (percent loss) | | | |
| Name and Location | Type and Extent | General Features | Rock Types (percent) | Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | | Sand | Gravel | Sand | Gravel | 100 rev. | 500 rev. | Sand | Gravel | Sand Equiv. | Organic Content |
| **Putah Creek —Continued** | | | Metabasic igneous 13-17<br>Vein quartz 3-5<br>Limestone 1-5<br>Schist 1-2<br>(Data from USBR) | & Gravel Co.<br>P.O. Box 66<br>Madison<br>SW¼ Sec. 28, (proj.), T. 8 N., R. 1 W., MDBM.<br>About 1 mile southwest of Winters. | dragline to water table at about 5′. Haul in bottom dump trucks a short distance to plant. | crushing plant. Crush in jaw and cone crushers. Dry screen over standard vibratory screens. | hour | sand and gravel, cement-treated base, road base | | | | | | | | | | | |
| **Russian River,** Sonoma County, Cloverdale to Jenner | Stream bars occur along the Russian River from Cloverdale south to the mouth at Jenner, a distance of about 45 miles. Bars range up to 1500′ in length and up to 700′ in width. Deep deposit—60′ deep at Healdsburg. | No overburden; replenishment in flood stage. Maximum size of gravel diminishes from 6″ at Cloverdale to 3″ at Healdsburg. Proportion of gravel to sand decreases downstream. About 50% sand near Windsor. Subangular to subrounded gravel. | Graywacke 51<br>Metabasic igneous 23<br>Chert 20<br>Vein quartz 5<br>Basalt 1 | Basalt Rock Co., Inc.<br>P.O. Box 540<br>Napa<br>Plant in Healdsburg.<br>Pit in NE¼ Sec. 9 (proj.) T.8N., R.9W., MDBM.<br>About 3 miles south of Healdsburg. | Excavate to depth of about 60′ with 8 cubic yard walking drag line. Haul about 3 miles to plant in bottom dump trucks. Dig behind berm to avoid mud-dying stream above resort area. Few percent plus 2″. | Wash over standard vibrating screens; wash sand in screw, drag and rake. Crush oversize in gyratory and roll crushers. | 400 tons per hour | Concrete and bituminous sand and gravel, road base | No of. tests | 10 | 10 | 10 | 10 | 10 | 12 | 10 | 13 | 11 | 10 |
| | | | | | | | | | Range of results | 2.57 to 2.67 | 2.66 to 2.72 | 1.7 to 3.3 | 0.9 to 1.8 | 3.8 to 9.2 | 10.1 to 21.0 | 3.6 to 6.4 | 3.1 to 6.1 | 76 to 89 | 1 |
| | | | | | | | | | Average 1961 | 2.65 | 2.70 | 2.1 | 1.3 | 4.7 | 18.0 | 4.6 | 4.7 | 80 | Satis. |
| | | | | Basalt Rock Co., Inc.<br>P.O. Box 540<br>Napa<br>(Windsor plant)<br>NE¼ Sec. 21 (proj.), T 8N., R.9W., MDBM.<br>About 5 miles south of Healdsburg. | Excavate in stream bed with 4 cubic yard walking dragline to about 25′ depth. Load into field bunker and haul in bottom dump trucks about 1000′ to plant. Few percent plus 2½″. Some clay lenses present. | Semi-portable screening plant; wash over standard vibrating screens; dewater sand with screw. | 400 tons per hour | Road base, bituminous sand | | | | | | | | | | | |
| | | | | Cloverdale Ready Mix<br>First St.<br>Cloverdale<br>SW¼ Sec. 7, T.11N., R.10 W., MDBM.<br>East edge of Cloverdale. | Excavate with dragline to about 5′ depth. Haul short distance to plant. Maximum size 6″. Slight excess of gravel over sand. Replenished in flood | Crush oversize in jaw crusher. Wash over screens; sand screw. | 150 yards per day | Concrete sand and gravel | No. of tests | 9 | 10 | 9 | 10 | 5 | 5 | 5 | 9 | 9 | 9 |
| | | | | | | | | | Range of results | 2.62 to 2.64 | 2.68 to 2.71 | 2.1 to 2.7 | 1.2 to 1.7 | 4.4 to 5.6 | 21.8 to 23.8 | 6.2 to 10.4 | 2.7 to 10.4 | 68 to 87 | 1 |
| | | | | | | | | | Average 1955-59 | 2.64 | 2.70 | 2.4 | 1.4 | 4.9 | 22.9 | 7.5 | 6.7 | 80 | Satis. |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | stage. Abundant plus 2½" gravel. Stockpile in winter. | | | | | | | | | | | | | |
| Hein Bros. Basalt Rock Co. P.O. Box 162 Petaluma SW¼ Sec. 9, (proj.), T.8N., R.9W., MDBM. About 3½ miles south of Healdsburg. | Excavate behind berm in stream bed with dragline to about 50'. Haul in end dump trucks about 1000' to plant. | Screening plant: wash over standard vibrating screens; twin screw for sand preparation. Scalp off plus 1½". | 75 tons per hour | Concrete sand and gravel | No. of tests | 4 | 8 | 4 | 8 | 4 | 4 | 4 | 8 | 4 | 4 |
| | | | | | Range of results | 2.63 to 2.66 | 2.65 to 2.72 | 1.6 to 2.0 | 1.0 to 1.5 | 4.4 to 4.8 | 20.8 to 22.6 | 3.8 to 4.6 | 2.0 to 7.2 | 81 to 95 | 1-2 |
| | | | | | Average 1955-58 | 2.65 | 2.69 | 1.8 | 1.4 | 4.7 | 21.7 | 4.1 | 3.9 | 88 | Satis. |
| Marshall Maxwell, Inc. 1330 King St. Santa Rosa NW¼ Sec. 29, T.8N., R.9W., MDBM. About 6½ miles east of Guerneville. | Excavates behind berm in stream bed with dragline to about 25' depth. Haul in end dump trucks about 0.2 mile to plant. Also process crushed calcined ore from Guerneville quicksilver mine. Gravel extends to 70' depth in water well for plant. | Simple screening plant: scalp off plus 1½"; wash over standard vibrating screens; classify sand in screw. | 300 tons per day | Concrete sand and gravel | No. of tests | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 |
| | | | | | Range of results | 2.66 | 2.66 2.68 | 1.3 | 1.3 1.4 | 4.6 | 21.2 | 3.1 | 2.4 2.6 | 84 | |
| | | | | | Average 1955 | | | | | | | | | | Satis. |
| Mirabel Sand Sand and Gravel (Wm. Fargo leased from Camgros) Mirabel Park SE¼, Sec. 31, T.8N., R.9W., MDBM. About 5 miles east of Guerneville. | Excavate behind berm in stream bed with drag line. Haul in end dump truck short distance to plant. | Simple screening plant: scalp off plus 1½"; wash over vibrating screens. | Estimated 50 tons per hour | Concrete sand and gravel | No. of tests | 2 | 4 | 2 | 4 | 1 | 1 | 1 | 2 | 2 | 2 |
| | | | | | Range of results | 2.64 2.66 | 2.66 to 2.73 | 2.1 to 1.5 | 1.0 to 1.6 | 4.4 | 20.2 | 3.5 | 4.0 4.0 | 88 83 | |
| | | | | | Average 1955-56 | | 2.69 | | 1.4 | | | | | | Satis. |
| Windsor Sand and Gravel P.O. Box 145 Windsor SW¼ Sec. 21 (proj.), T.8N., R.9W., MDBM. About 6 miles south of Healdsburg. | Excavate selectively from several areas in stream bed. Dig behind berm with draglines to 20' depths. Load in bottom dump trucks and scrapers for haul of about 0.3 mile to plant. Few % plus 2½", 3" max. At plant, gravel is present to depth of about 60' (per operator). | Dump into grizzly or stockpile and bulldoze into grizzly. Wash over standard vibrating screens. Crush plus 1½" in gyratory crusher. Use rod mill to manufacture some fine sand from pea gravel and combine with natural sand prepared in 48" Wemco screw; use cyclone to recover fine sand. | 3000 tons per day | Concrete sand and gravel, road base | No. of tests | 4 | 9 | 4 | 9 | 5 | 5 | 4 | 8 | 3 | 4 |
| | | | | | Range of results | 2.63 to 2.66 | 2.62 to 2.71 | 1.4 to 2.2 | 1.0 to 1.7 | 2.8 to 5.6 | 18.0 to 23.8 | 2.5 to 5.0 | 2.0 to 7.8 | 83 79 82 | 1 |
| | | | | | Average 1957-62 | 2.65 | 2.67 | 1.7 | 1.4 | 4.5 | 21.6 | 3.8 | 5.4 | | Satis. |

## DEPOSITS

## UTILIZATION

### Fixed Plant Operations

### Laboratory Test Data

| Name and Location | Type and Extent | General Features | Rock Types (percent) | Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | | Specific Gravity: Sand | Specific Gravity: Gravel | Absorption (percent): Sand | Absorption (percent): Gravel | Abrasion (percent loss): 100 rev. | Abrasion (percent loss): 500 rev. | Soundness (percent loss): Sand | Soundness (percent loss): Gravel | Sand Equiv. | Organic Content |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **San Benito River,** San Benito County, near Hollister | Stream bed deposit extends for about 7 miles upstream from Hollister; average width 1,000'; shallow depth | Little to no overburden, replenished in flood-stage; maximum size 6", diminishes downstream, at Hollister Sand and Gravel Co. pit, deposit contains 70% sand and 30% gravel. Becomes predominantly sandy at Hiway 101 crossing to west. Subangular to subrounded gravel. | Graywacke 46<br>Chert .8<br>Silica carbonate .8<br>Acid volcanic 7<br>Granitic 7<br>Vein quartz 7<br>Metavolcanic 6<br>Calcareous siltstone 4<br>Serpentine 4<br>Schist 2<br>Claystone 1 | Don L. Rider Cienega Road Hollister SE ¼ Sec. 3 (proj.), T. 13 S., R. 5 E., MDBM. About 1 mile south of Hollister | Excavate with shovel to 10' depth; load end dump trucks for short haul to plant. | Feed plant from stockpile with dragline scraper; crush with primary jaw and secondary gyratory, and screen to sizes. Dry operation. | 200 tons per day | Concrete and bituminous sand and gravel, road base | No. of tests | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| | | | | | | | | | Range of results | 2.60<br>2.57 | 2.64<br>2.54 | 1.5<br>1.7 | 1.7<br>2.0 | 6.6<br>5.6 | 28.8<br>24.9 | 4.2<br>6.3 | 9.3<br>7.7 | 98<br>71 | 1 |
| | | | | | | | | | Average 1959 | | | | | | | | | | Satis. |
| | | | | Hollister Sand and Gravel Co. Nash Road Hollister. NE ¼ Sec 4 (proj.), T. 13 S., R. 5 E., MDBM. About ½ mile southwest of Hollister | Excavate with tractor-scraper to 10' depth; load bottom dump trucks with field conveyors; haul short distance to plant; work above water table to 25' depth. | Raw material conveyed by belt feeder to a scrubber with trommel screen in middle; scalp off plus 1½" to crush in jaw crusher; wash over vibrating screens; sand prepared by Eagle screw. | 300 tons per hour | Concrete sand and gravel | No. of tests | 11 | 17 | 14 | 19 | 13 | 13 | 11 | 19 | 7 | 10 |
| | | | | | | | | | Range of results | 2.56 to 2.60 | 2.58 to 2.64 | 1.3 to 1.8 | 1.4 to 2.6 | 4.8 to 7.0 | 23.8 to 28.8 | 2.3 to 5.1 | 3.3 to 14.4 | 76 to 82 | 1+ |
| | | | | | | | | | Average 1959-61 | 2.59 | 2.62 | 1.5 | 1.9 | 6.0 | 26.6 | 4.3 | 8.0 | 79 | Satis. |
| **San Joaquin River,** boundary between Madera and Fresno Counties, vicinity Fresno | Stream bed and floodplain deposit extends from Friant Dam south for about 20 miles. Deposit varies in width (including floodplain adjacent to the river) from ½ to 1 mile. Gravels extend down 6 to 21' to a clay layer (at least 2' thick), and are reported to occur underneath clay to 70' depth. | No replenishment. Overburden ranges from none in stream bed to over 15' in floodplain to either side. Maximum size gravel 8" near Friant gradually decreases downstream to about 4" near Herndon. About 8 miles west of Herndon deposit becomes predominantly sandy. Sand content ranges from 50-75% of deposits. Well-rounded gravel. | Granitic 44<br>Metavolcanic (Acidic) 36<br>Andesite 12<br>Basalt 5<br>Quartzite 2<br>Schist and gneiss 1<br>(Data from USBR | Anderson Rock Products 11000 N. Lanes Road, Fresno NE ¼ Sec. 16, T. 12 S., R. 20 E., MDBM. Pit in SE ¼ Sec. 9. About 4 miles north of Pinedale. | Excavate with dragline to varying depths of from 6-10' from pit in floodplain (adjacent to stream). About 3' of overburden. Haul 0.3 miles in end dump trucks to plant Bottom on clay layer. 6" maximum | Crush oversize in primary jaw and secondary cone. Wash over standard vibrating screens; dewater sand in sand drag. | 600 tons per day | Concrete and bituminous sand and gravel | | | | | | | | | | |
| | | | | Cerutti and Thompson Trans. Co. 5110 Rd. 26¾ Madera NW ¼ Sec. 12, T. 13 S., R. 17 E., MDBM. (Madera Co.). About 8 miles west of Herndon. | Excavate with suction dredge from stream bed, and dragline from dry pit in floodplain, to about 25'. Haul from pit about 100' to plant in end dump trucks. Pump slurry from dredge to plant. Dry pit is about 100' long x 25' wide x 25' deep with little overburden; | Slurry from dredge dewatered over vibrating screens. Oversize and feed from pit go to a dry crushing and screening plant consisting of a primary jaw and secondary cone crushers. | 120 tons per hour | Concrete and bituminous sand and gravel, road base | No. of tests | 5 | 4 | 4 | 4 | 2 | 2 | 4 | 4 | 4 | 4 |
| | | | | | | | | | Range of results | 2.62 to 2.66 | 2.60 to 2.64 | 0.9 to 1.3 | 0.7 to 1.0 | 3.8 to 4.2 | 20.2 to 19.8 | 1.4 to 2.1 | 0.6 to 1.4 | 82 to 95 | 1 |
| | | | | | | | | | Average 1955-56 | 2.63 | 2.62 | 1.0 | 0.9 | | | 1.7 | 1.0 | 89 | Satis. |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 4″ maximum; contains 50% sand. | | | | | | | | | | | | |
| C. B. Hines, 6975 N. Dower Ave. Fresno. SE ¼ Sec. 35, T. 12 S., R. 18 E., MDBM. About 3½ miles west of Herndon. | Excavates from pit in floodplain to 12′ depth. Bottom on clay layer. Haul few hundred feet in end dump truck to plant. | Crush oversize in jaw crusher. Wash over standard vibrating screens into steel bunkers. | 25-50 tons per hour | Concrete sand and gravel | | | | | | | | | |
| Industrial Asphalt Inc. 3143 South Hiway 99, Fresno SW ¼ Sec. 20, T. 12 S., R. 20 E., MDBM. About 2 miles north of Pinedale, in Madera County. | Excavate from pits 1,000′ x 500′ in floodplain, to depths of 15′. Bottom on silty clay layer. Haul in end dump trucks short distance to plant. Maximum size gravel is 5″. Four-five feet of overburden. | Crush plus 1½″ in 2 jaw and gyratory (one) crushers. Wash over standard vibrating screens and sand screw. | 300 tons per hour | Concrete and bituminous sand and gravel | No. of tests | 6 | 8 | 6 | 8 | 4 | 4 | 4 | 6 | 6 | 4 |
| | | | | | Range of results | 2.61 to 2.62 | 2.60 to 2.67 | 0.9 to 1.4 | 0.9 to 1.3 | 5.0 to 6.2 | 21.4 to 24.4 | 1.4 to 2.8 | 1.0 to 3.9 | 88 to 97 | 1-2 |
| | | | | | Average 1961 | 2.62 | 2.63 | 1.1 | 1.1 | 4.6 | 23.1 | 2.0 | 2.8 | 92 | Satis. |
| Miller Bros. 7700 N. Blythe, Fresno. SW ¼ Sec. 26, T. 12 S., R. 19 E., MDBM. About 2 miles northeast of Herndon. | Excavate, with dragline from island in river channel, to depths of about 18′. Haul short distance to plant in truck. | Scalp off plus 1½″, wash minus 1½″ in two trommel screens, sand screw. | 120 tons per hour | Concrete sand and gravel | No. of tests | | 1 | | 1 | 1 | 1 | | 1 | | |
| | | | | | Range of results | | 2.63 | | 1.0 | 4.4 | 20.6 | | 0.3 | | |
| | | | | | Average | (Test | Result | s 12-1 | -52) | | | | | | |
| Pacific Cement and Aggregates, Inc. 400 Alabama St. San Francisco SE ¼ Sec. 36, T. 11 S., R. 20 E., MDBM. About 4½ miles south of Friant. | Excavate from pit 2,000′ x 750′ in floodplain with 2 draglines, to depth of approx. 35′. Haul in bottom dump trucks about 2,000′ to plant. Overburden is 15′ thick. Gravelly layer is 20′ thick. Bottom on layer of gravel encrusted with iron oxide. 8″ maximum. | Scalp off plus 1½″ in trommel screen. Crush oversize in primary jaw and 2 secondary cone crushers. Wash over standard vibrating screens; sand drags (2) | 400 tons per hour | Concrete sand and gravel, road base | No. of tests | 4 | 8 | 4 | 8 | 3 | 3 | 3 | 5 | 3 | 4 |
| | | | | | Range of results | 2.62 to 2.64 | 2.63 to 2.71 | 0.7 to 1.2 | 0.7 to 1.0 | 5.0 4.4 4.2 | 20.6 18.4 19.2 | 1.8 3.6 2.1 | 0.7 to 3.4 | 96 91 89 | 1 |
| | | | | | Average 1956-61 | 2.63 | 2.65 | 1.0 | 1.8 | | | | 2.1 | | Satis. |
| River Rock Products. P.O. Box 1319, Fresno. SE ¼ Sec. 27, T. 12 S., R. 19 E., MDBM. About 2 miles northeast of Herndon. | Excavate with dragline from pit in floodplain, to depths of 20′. Haul in end dump truck about 1,500′ to plant. 4″ maximum. Overburden increases to west. | Crush plus 1½″ in 3 gyratory cone crushers. Wash over standard vibrating screens; hydraulic sand sizing tank, dewatering screw. | 2,000 tons per 8 hours | Concrete and bituminous sand and gravel | No. of tests | 7 | 10 | 7 | 10 | 6 | 6 | 4 | 7 | 5 | 5 |
| | | | | | Range of results | 2.59 to 2.63 | 2.61 to 2.69 | 0.9 to 1.5 | 0.9 to 1.3 | 3.4 to 5.0 | 19.0 to 21.4 | 1.6 to 2.9 | 0.9 to 2.5 | 92 to 97 | 1 |
| | | | | | Average 1956-61 | 2.61 | 2.64 | 1.1 | 1.0 | 4.3 | 20.0 | 2.5 | 1.7 | 94 | Satis. |

| DEPOSITS | | | | UTILIZATION | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Fixed Plant Operations | | | | | Laboratory Test Data | | | | | | | | | | | | |
| | | | | | | | | | | Specific Gravity | | Absorption (percent) | | Abrasion (percent loss) | | Soundness (percent loss) | | | | |
| Name and Location | Type and Extent | General Features | Rock Types (percent) | Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | | Sand | Gravel | Sand | Gravel | 100 rev. | 500 rev. | Sand | Gravel | Sand Equiv. | Organic Content |
| San Joaquin River —Continued | | | | San Joaquin Rock Co., 1926 Michigan, Fresno. SW ¼ Sec. 10, T. 11 S., R. 20 E., MDBM. Pit in NE ¼ Sec. 10. About 6 miles south of Friant Dam. | Excavate from floodplain adjacent to stream with dragline, to about 10′. Bottom on 2′ clay layer. Gravel reported in well near plant to depth of 70′. Haul about 0.7 mile, in bottom dump trucks, to plant. | Scalp off plus 1½″ and crush in primary jaw, secondary cone (2) crushers. Wash over vibrating screens, 54″ sand screw. | 200 tons per hour | Concrete and bituminous sand and gravel, road base | No. of tests | 4 | 1 | 5 | 1 | 1 | 1 | 4 | 1 | 4 | 4 |
| | | | | | | | | | Range of results | 2.60 to 2.63 | 2.66 | 1.1 to 1.3 | 0.9 | 6.4 | 24.8 | 2.4 to 2.6 | 2.9 | 88 to 93 | 1 |
| | | | | | | | | | Average 1959-60 | 2.64 | | 1.2 | | | | 2.4 | | 91 | Satis. |
| | | | | Stewart and Nuss, Inc. 410 Thorne Ave. Fresno Herndon #2 plant. SE ¼ Sec. 26, T. 12 S., R. 19 E., MDBM. About 3 miles northeast of Herndon. | Excavate from stream bed and adjacent floodplain with dragline. Work to 12′ depth limit, bottom on clay layer. 4″ maximum. Overburden increases to 3′ away from channel. | Scalp off plus 1½″ and crush in two gyratory crushers. Wash over standard vibrating screens sand drag, sand screw. | 250 tons per hour | Concrete sand and gravel, road base | No. of tests | | 1 | | 1 | 1 | 1 | | 1 | 1 | |
| | | | | | | | | | Range of results | | 2.60 | | 1.1 | 5.8 | 19.4 | | 3.5 | 96 | |
| | | | | | | | | | Average 1961 | | | | | | | | | | |
| | | | | Stewart and Nuss, Inc. 410 Thorne Ave. Fresno. Herndon Plant. SE ¼ Sec. 31, T. 12 S., R. 19 E., MDBM. About 1 mile northeast of Herndon. Pit in SW ¼ Sec. 35, T. 12 S., R. 18 E., MDBM. | Excavate with dragline from stream bed and adjacent floodplain—to depths of 6-20′. Haul in bottom dump trucks 3.4 miles east to plant. 4″ maximum gravel, overburden up to 3′ in places. | Scalp over revolving trommel screen, crush plus 1½″ in 2 gyratory crushers. Wash over standard vibrating screens, and sand screw. | 250-300 tons per hour | Concrete and bituminous sand and gravel, road base | No. of tests | 10 | 10 | 9 | 11 | 5 | 5 | 7 | 9 | 10 | 10 |
| | | | | | | | | | Range of results | 2.59 to 2.65 | 2.60 to 2.65 | 0.6 to 1.5 | 0.8 to 1.3 | 3.9 to 5.4 | 18.8 to 23.0 | 1.4 to 2.4 | 0.3 to 2.4 | 83 to 100 | 1 |
| | | | | | | | | | Average 1958-61 | 2.61 | 2.63 | 1.1 | 1.0 | 4.9 | 21.3 | 2.0 | 1.1 | 95 | Satis. |
| | | | | Volpa Brothers, 233 Neilsen, Fresno. NE ¼ Sec. 15, T. 12 S., R. 20 E., MDBM. About 4 miles north of Pinedale. | Excavate with dragline from pit 1,000′ x 500′ x 40′ in floodplain. Overburden up to 20′ in places. | Wash over trommel screen, crush and screen in portable plant. | Estimated 100 tons per hour | Road base | | | | | | | | | | | | |

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| **San Luis Creek,** Merced County, near Los Banos | Stream bed deposit extends for about 1 mile from a point about 3¼ miles south of Highway 152. About 800′ wide and at least 6′ deep. | Little or no overburden. Maximum size gravel 6″, occasional 14″ boulders present. Subrounded to subangular gravel. | Lithology similar to Los Banos Creek deposit. | Used intermittently by contractors with portable plants as a source of road base. | | | | | | | | | | | | | | | |
| **Santa Clara Formation,** Santa Clara County, near San Jose | The Santa Clara Formation, which occurs on the west side of the Santa Clara Valley in the low lying foothill areas, contains crudely stratified conglomerate layers, up to 30′ thick, interbedded with sand, silt and clay layers up to 10′ thick. The conglomerate unit trends northwest and dips about 30° to the northeast along Stevens Creek road where about 50 acres have been commercially developed. | Overburden ranges from a few feet, to over 30′ of silt. Average size gravel 3″ in silt, clay and sand matrix. Locally, conglomerate is cemented and well-indurated. Some 1′ boulders present. A brown, weathered zone, 35-100′ thick, overlies a blue reduced zone. Clay content which is related to the degree of oxidation is higher in the brown zone. Sub-angular to sub-rounded gravel. | Graywacke ..... 83<br>Greenstone ..... 5<br>Chert .. 2<br>Vein quartz .. <1 | Santa Clara Sand and Gravel Co. P.O. Box 638 Santa Clara. SE¼ Sec. 22, T. 7 S., R. 2 W., MDBM. About 2 miles southwest of Cupertino. | Excavate from bowl-shaped, dry pit, approx. 1000′ in diameter and about 300′ deep. Work in benches with bulldozers that rip and doze to a stockpile. Weathered portion 35-100′ thick. From 3-30′ of overburden. | Front-end shovel loader feeds a Cedar Rapids dry, portable crushing plant which consists of a primary jaw (set at 2″), secondary roll crushers, and vibrating screens. | 500 tons per hour | Cement treated road base, fill | | | | | | | | | | |
| | | | | A. F. Voss 10445 Stevens Creek Rd. Cupertino SW¼ Sec. 22, T. 7 S., R. 2 W., MDBM. About 2½ miles southwest of Cupertino. | Excavate with tractor-rippers from pit. Work in 20′ benches; working face 100′ high. | Primary jaw, secondary roll crushers; vibrating screens. | Estimate 100 tons per hour | Road base, fill | | | | | | | | | | |
| **Santa Margarita Formation,** Santa Cruz County, near Felton | About 200′ of arkosic sandstone occurs in the Miocene Santa Margarita Formation in the Scott Valley area. The formation crops out over a 9 mile long area between Felton and Santa Cruz, and ranges from 2 to 3 miles in width. | Slight soil overburden. Poorly-consolidated crossbedded, well-sorted, uncemented, fine-medium sand, with some thin gravel beds up to 2′ thick. Gravel rarely exceed maximum size of 2½″. Deposit appears to contain coarser material with depths. | About 60% quartz, 40% feldspar, minor heavy minerals. | Central Supply Co. P.O. Box 151 Watsonville SE¼ Sec. 10, T. 10 S., R. 2 W., MDBM. About 1 mile northeast of Felton. | Hydraulic with 2 monitors that sluice material downhill to plant via a 24″ x 12″ wooden flume, 1500′ long. | Rescreen slurry. Plus No. 8 scalped off. Minus no. 8 classified in hydraulic tank, dewatered in 3 sand screws, recombined with coarse sizes, and stockpiled. | 100-125 tons per hour | Concrete sand | No. of Tests | 4 | | 4 | | | 3 | | 4 | 4 |
| | | | | | | | | | Range of Results | 2.56 to 2.58 | | 0.6 to 0.9 | | | 2.9<br>3.4<br>3.2 | | 97 to 100 | 1 |
| | | | | | | | | | Average 1959-60 | 2.58 | | 0.7 | | | | | 98 | Satis. |
| | | | | Graham and Son 500 Mt. Herman Rd. Santa Cruz NE¼ Sec. 24, T. 10 S., R. 2 W., MDBM. Approx. 2½ miles east of Felton. | Excavate from semi-circular open cut 1000′ wide x 500′ long x 40′ high. Bulldoze sand off top of working face. Load trucks with front-end shovel loader for haul of about 0.25 mile to plant. Deposit is crossbedded and contains lenses of coarse and fine sand about 20′ thick with an occasional gravel interbed about 2′ thick (with ¾″ | Wash over standard vibrating screens into bunkers of ready mix plant. | Small | Concrete sand and gravel | No. of Tests | 4 | | 5 | | | 4 | | 5 | 4 |
| | | | | | | | | | Range of Results | 2.54 to 2.59 | | 1.1 to 1.4 | | | 2.7 to 4.4 | | 86 to 94 | 1 |
| | | | | | | | | | Average 1956-59 | 2.56 | | 1.3 | | | 3.4 | | 91 | Satis. |

| DEPOSITS | | | | UTILIZATION | | | | | | | | | | | | | | | |
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| | | | | Fixed Plant Operations | | | | | Laboratory Test Data | | | | | | | | | | |
| | | | | | | | | | | Specific Gravity | | Absorption (percent) | | Abrasion (percent loss) | | Soundness (percent loss) | | | |
| Name and Location | Type and Extent | General Features | Rock Types (percent) | Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | | Sand | Gravel | Sand | Gravel | 100 rev. | 500 rev. | Sand | Gravel | Sand Equiv. | Organic Content |
| Santa Margarita Formation —Continued | | | | | maximum gravel). | | | | | | | | | | | | | | |
| | | | | Henry J. Kaiser Co. 1924 Broadway Oakland NE¼ Sec. 23, T. 10 S., R. 2 W., MDBM. About 1½ miles east of Felton. | Excavate with bulldozer that pushes sand to underground hopper from which sand is conveyed by belt approx. 1500′ to plant. | Wash over standard vibrating screens. The minus no. 4 is classified in an Eagle hydraulic tank and dewatered in 4 spiral classifiers. Overflow from screws flumed to 5 Krebs cyclones to remove fine sand. | 300 tons per hour | Plaster and concrete sand | No. of Tests | 10 | | 10 | | | | 4 | | 10 | 10 |
| | | | | | | | | | Range of Results | 2.55 to 2.60 | | 0.5 to 1.3 | | | | 1.1 to 4.6 | | 73 to 98 | 1 |
| | | | | | | | | | Average 1957-61 | 2.58 | | 0.9 | | | | 2.4 | | 90 | Satis. |
| | | | | Pacific Cement and Aggregates, Inc. 400 Alabama St. San Francisco NW¼ Sec. 14, T. 10 S., R. 2 W., MDBM. About 1 mile northeast of Felton. | Excavate with scraper carry-alls that haul to a stock pile. Bulldozer feeds conveyor belt. Occasionally use tractor with ripper to loosen sand portion of pit contains coarse sand; other portion fine. Work both ends of pit and recombine on conveyor to plant. Excavate to about 30′ depth over several acres. Little overburden. | Vibrating feeders load conveyors which transport sand from pit several hundred feet. Wash sand in two trommel screens. Scalp off and waste plus no. 4. Dewater in three screw-type classifiers. | About 100 tons per hour | Concrete and plaster sand | | | | | | | | | | | | | |
| | | | | Santa Cruz Aggregates Co. 646 Lockhart Gulch Rd. Santa Cruz SE¼ Sec. 14, T. 10 S., R. 2 W., MDBM. Approx. 2 miles east of Felton. | Excavate sand with bulldozer which pushes material off top of bench 60-100′ high. Sand is reclaimed from tunnel on floor of pit and conveyed to washing plant. About 10% gravel in pit; average max- | Plus 2½″ is wasted. 2½″-¾″, ¾″-⅜″, ⅜-#4 are washed over screens and conveyed to bunkers. Hauled by truck to a secondary washing plant consisting of a scrubber and 2 trom- | 65 tons per hour | Concrete sand and gravel, plaster sand | No. of Tests | 1 | | 1 | | | | 1 | | 1 | 1 |
| | | | | | | | | | Range of Results | 2.59 | | 0.9 | | | | 2.8 | | 88 | 1 |
| | | | | | | | | | Average 1959 | | | | | | | | | | Satis. |

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| | | | | | imum size is 2½", but large boulders are common. Deposit finer at surface; boulders at depth. | mels. Minus No. 4 is classified at first plant by two sand screws. Fine sand is reclaimed from bowl classifier with a sand drag. | | | | | | | | | | | | | |
| **Santa Rosa Creek,** Sonoma County, near Santa Rosa | Stream bed deposit, narrow and shallow, is limited in extent to approx. 15,000 cubic yards, located near city limits of Santa Rosa. About 10′ of gravel remains above clay layer. | No overburden and no replenishment. Maximum size 4". Sub-angular to sub-rounded gravel. | Predominantly sandstone and miscellaneous basic volcanic rocks; chert, tuff, and serpentine. (Data from Div. of Hways.) | The Empire Rock Co., Inc., occasionally excavates material from creek bed for use as unprocessed base. | | | | | | | | | | | | | | | |
| **Sonoma Creek,** Sonoma County, near Sonoma | Stream bed deposit extends from Schellville to Glen Ellen; a distance of about 9 miles. Narrow deposit is about 60′ deep. Largest bar containing about 10,000 cubic yards is located 2 miles below city of Sonoma (1958). | Slight overburden. Overgrown with trees and brush. Replenished in flood stages. Maximum size 8" at Sonoma decreases to 4" maximum at Schellville. Deficient in fine sand. Sub-angular to sub-rounded gravel. | Predominantly volcanic rock types with tuff, serpentine, opal and silica carbonate rock. (Data from Div. of Hways.) | In past, aggregate was dredged at Schellville and barged to the East Bay. Sonoma Readimix formerly operated a screening plant in Sec. 12, T. 5 N., R. 6 W. Plant is now idle. | | | | | | | | | | | | | | | |
| **Stanislaus River,** San Joaquin and Stanislaus Counties, near Oakdale | Sand and gravel occur in the floodplain and older terraces between Knights Ferry and Riverbank, a distance of about 18 miles. Deposit, including terraces, ranges from ¼ to 1 mile in width. Depth of gravel variable; is deep as 18′ on irregular bedrock near Oakdale. Near Riverbank, the terraces deposits are up to 30′ deep. | Overburden ranges from 3 to 10′. No replenishment. Terrace deposits are deficient in gravel, containing up to 70% sand; with a maximum size of 8". Maximum size gravel in floodplain is 5" near Oakdale, larger cobbles upstream near Knights Ferry. Sub-rounded gravel. | Granitic 15–25<br>Quartzitic metasedimentary rock . . 20±<br>Greenstone 20±<br>Tertiary volcanic rock 15–20<br>Vein quartz 2–5<br>Basic igneous rock . . . 1–5<br>Schist . . . 1–5<br>(Calif. Jour. mines and Geol., Jan. 1955, p. 61). | Munn and Perkins P.O. Box 1092 Modesto SW ¼ Sec. 15, T. 2 S., R. 9 E., MDBM. About 3 miles southeast of Escalon. | Excavate with suction dredge from pit in terrace. Pump slurry several hundred feet to plant. | Crush oversize in primary jaw and secondary cone crushers. Wash over standard vibrating screens, sand screw. | 100 tons per hour | Concrete and bituminous sand and gravel, plaster sand | No. of tests | 6 | | 6 | | | | 4 | | 5 | 5 |
| | | | | | | | | | Range of results | 2.59 to 2.63 | | 1.0 to 2.2 | | | | 1.4 to 3.7 | | 85 to 99 | 1 |
| | | | | | | | | | Average 1957-61 | 2.61 | | 1.5 | | | | 2.6 | | 93 | Satis. |
| | | | | Standard Rock Co. P.O. Box 696 Escalon NW ¼ Sec. 10, T. 2 S., R. 10 E., MDBM. About 1 mile west of Oakdale. | Excavate with dragline which works behind berm to avoid stream bed. Truck about ½ mile to plant. | Crush oversize in primary jaw and secondary cone crushers. Wash over standard vibrating screens and in sand screw. Have gold-saving device. | 150 tons per hour | Concrete and bituminous sand and gravel | No. of tests | 10 | 10 | 10 | 10 | 10 | 10 | 8 | 10 | 10 | 10 |
| | | | | | | | | | Range of results | 2.61 to 2.67 | 2.64 to 2.69 | 1.3 to 2.1 | .06 to 1.3 | 3.8 to 5.8 | 19.8 to 23.2 | 2.7 to 3.9 | 1.0 to 4.3 | 76 to 95 | 1 |
| | | | | | | | | | Average 1961-62 | 2.64 | 2.67 | 1.7 | 1.1 | 4.6 | 21.2 | 3.3 | 2.2 | 86 | Satis. |
| | | | | The Modesto Sand and Gravel Co. operates a small screening and washing plant at Ripon to produce plaster sand. | | | | | | | | | | | | | | | |
| **Sulphur Creek,** Napa County, near St. Helena | Stream bed deposit extends for about 2 miles upstream from its junction with Napa River; width varies from 50-500′; shallow deposit. | No overburden, replenished in flood stage, maximum size 4". Sub-angular to sub-rounded gravel | Graywacke . . 90<br>Greenstone 6<br>"Sonoma volcanics" 3<br>Shale 1 | Harold Smith and Son Contr. P.O. Box 232 St. Helena SE ¼ Sec. 36, T. 8 N., R. 6 W., MDBM. Approx. ½ | Excavates with front end loader to 4′ depth above water table; haul in end dump about 1 mile to plant. | Primary jaw crusher, standard vibratory screens, screw-type sand classifier, wash over screens. | 500 tons per day | Concrete sand and gravel road base | No. of tests | 2 | 4 | 2 | 4 | 2 | 2 | 2 | 4 | 2 | 1 |
| | | | | | | | | | Range of results | 2.59 2.59 | 2.61 to 2.64 | 2.2 3.0 | 2.1 to 2.3 | 7.0 7.6 | 30.2 33.0 | 18.9 16.9 | 8.8 to 25.9 | 72 74 | 1 |
| | | | | | | | | | Average 1958 | | 2.62 | | 2.2 | | | | 15.7 | | Satis. |

| DEPOSITS | | | | UTILIZATION | | | | | | | | | | | | | | |
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| | | | | Fixed Plant Operations | | | | Laboratory Test Data | | | | | | | | | | |
| | | | | | | | | | Specific Gravity | | Absorption (percent) | | Abrasion (percent loss) | | Soundness (percent loss) | | | Organic Content |
| Name and Location | Type and Extent | General Features | Rock Types (percent) | Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | | Sand | Gravel | Sand | Gravel | 100 rev. | 500 rev. | Sand | Gravel | Sand Equiv. | |
| **Sulphur Creek** – Continued | | | | mile west of St. Helena. | | | | | | | | | | | | | | | |
| **Tule River,** Tulare County, near Porterville | Stream bed and floodplain deposit extends for about 5 miles below Success Dam. Stream bed is partially depleted. Floodplain has average width of 0.25 mile. Narrow channel, shallow deposits—bottom at 12′ on thick silt layer. | Overburden on floodplain is from 8-12′ deep. No replenishment since Success Dam built. Abundant plus 5″ gravel, many 4′ boulders present. High percentage of sand in floodplain. Stream bed becomes excessively sandy at Porterville Sub-rounded gravel. | Granitic 30<br>Greenstone 22<br>Quartzite 36<br>Gabbroic 8<br>Schist 3<br>Phyllite 1<br>(Data from USBR) | E. F. Quiram & Sons 406 Garden St. Porterville SW ¼ Sec. 31, T. 21 S., R. 28 E., MDBM. About ½ mile east of Porterville. | Excavate from stream bed to about 20′ depth with dragline. Haul about 500′ to plant. | Crush in primary jaw, secondary cone. Wash over standard vibrating screens and sand screw. | Approx. 200 tons per hour | Concrete sand and gravel, drain gravel | | | | | | | | | | |
| | | | | Sequoia Rock Co. P.O. Box 912 Porterville NE ¼ Sec. 3, T. 22 S., R. 28 E., MDBM. About 4 miles east of Porterville. Pit in NE ¼ Sec. 4 | Excavate with dragline from dry pit in floodplain—to 12′ depth. Load end dump trucks for haul of about 1 mile east to plant. | Crush plus 5″ in primary jaw; secondary crushing in two gyratory crushers. Wash over standard vibrating screens and sand screw. | 250 tons per hour prepared; 150 tons per hour dry | Concrete and bituminous sand and gravel, road base | No. of tests | 6 | 9 | 7 | 10 | 3 | 3 | 4 | 6 | 6 | 7 |
| | | | | | | | | | Range of results | 2.61 to 2.63 | 2.71 to 2.79 | 0.7 to 1.4 | 0.7 to 1.2 | 7.0 to 8.0 | 26.8 to 27.2 | 2.2 to 4.3 | 0.8 to 2.4 | 86 to 96 | 1 |
| | | | | | | | | | Average 1958-61 | 2.62 | 2.74 | 1.1 | 0.9 | | | 3.0 | 1.5 | 93 | Satis. |
| **Tuolumne River,** Stanislaus County, east of Modesto | Stream bed and floodplain deposits extend from Empire to Waterford, a distance of about 8 miles. Deposits along this stretch are restricted to the narrow, active floodplain which is about 100′ in maximum width. Adjacent terraces contain gravel at depth, but overburden is excessive. Above Waterford, the floodplain extends for about 5 miles with an average width of ½ mile. Gravels extend to depths of over 70′ in places in the stream bed. However, occasional clay layers up to 18″ thick and/or cemented gravel | Little overburden; no replenishment. Maximum size of gravel is 8″ upstream, diminishing to 3″ maximum about 5 miles east of Modesto. At this point deposit contains about 70% sand; below this point deposit is predominantly sandy. Sub-rounded gravel. | Quartzitic metasedimentary 53<br>Metavolcanic 13<br>Greenstone 10<br>Gneissic granite 4<br>Hornfels 4<br>Granitic 3<br>Diorite-gabbro 3<br>Siliceous volcanic 3<br>Volcanic Vein quartz 1<br>Amphibolite 1<br>Schist 1<br>Claystone 1 | American Sand and Gravel Co., Inc. 2402 McHenry Ave. Modesto NW ¼ Sec. 1, T. 4 S., R. 10 E., MDBM. About 4 miles southwest of Waterford. | Excavate from stream bed, with slackline cableway, to depths of 22-40′. Bucket empties directly into plant. Maximum size 4″ | Crush oversize with jaw crusher. Wash over standard vibrating screens; sand drag. | 300 yards per day | Concrete sand and gravel | No. of Tests | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 |
| | | | | | | | | | Range of Results | 2.62 | 2.67<br>2.67 | 1.7 | 0.5<br>0.7 | 4.8 | 22.6 | 4.0 | 0.3<br>1.2 | 91 | |
| | | | | | | | | | Average 1956 | | | | | | | | | | Satis |
| | | | | | Excavate from dry pit in adjacent terrace, which is 25′ higher, with dragline. Strip off 4-10′ of overburden to obtain sand up to 40′ deep | Screen off plus no. 4, wash over screens. De-water sand with drag. | Estimated 25 tons per hour | Plaster sand | | | | | | | | | | | |
| | | | | Hughson Gravel Plant P.O. Box 35 Hughson SE ¼ Sec. 3, T. 4 S., R. 10 E., MDBM. About 5 miles west of Waterford. | Excavate with slackline cableway from stream bed to depths of 12-30′, bottom on clay layer. Approx. 70% sand; 3″ maximum. | Crush plus ¾″ in primary jaw and secondary cone crushers. Wash over standard vibrating screen; sand drag. | 25 tons per hour | Concrete sand and gravel | | | | | | | | | | |

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| layers limit depths of excavation to from 12-30′, and locally to 70′. | Putnam Sand and Gravel Co., Inc. P.O. Box 486 Modesto SW¼ Sec. 33, T. 3 S., 11 E., MDBM. 1 mile southwest of Waterford. | Excavate with slackline cableway from stream bed, to 20′ depth. Bottom on clay. Bucket empties directly into plant. 4″ maximum. | Crush oversize in primary jaw, 2 secondary cone crushers. Wash in log washer, over standard vibrating screens; sand drag. | 50 cubic yards per hour | Concrete sand and gravel, road base | | | | | | | | | | | |
| | George and Wendell G. Reed 529 Covena Ave. Modesto SE¼ Sec. 25, T. 3 S., R. 11 E., MDBM. (Plant) Pit in NW¼ Sec. 36, T. 3 S., R. 11 E., MDBM. About 2½ miles east of Waterford. | Excavate with dragline from floodplain. Haul in trucks about 0.2 miles to plant. Maximum size 8″. | Crush oversize in primary jaw and secondary cone crushers. Wash over standard vibrating screens. | 100 tons per hour | Concrete and bituminous sand and gravel, road base | | | | | | | | | | | |
| | Santa Fe Rock and Sand P.O. Box 3042 Modesto NW¼ Sec. 6, T. 4 S., R. 11 E., MDBM. About 3 miles southwest of Waterford. | Excavate with dragline from stream bed to depths of 7-12′. Bottom on "hard pan". Haul in bottom dump trucks to plant. | Stockpile. Feed plant with tractor shovel. Crush oversize in primary jaw and secondary cone crushers Wash over standard vibrating screens; classify sand in sand screw. | 100 tons per hour | Concrete gravel, bituminous sand and gravel | No. of Tests | 3 | 8 | 3 | 8 | 3 | 3 | 3 | 6 | 3 | 2 |
| | | | | | | Range of Results | 2.60<br>2.63<br>2.64 | 2.66<br>to<br>2.73 | 1.6<br>2.2<br>1.5 | 0.5<br>to<br>0.8 | 3.8<br>3.4<br>4.2 | 20.0<br>18.2<br>20.4 | 3.7<br>2.8<br>2.5 | 0.4<br>to<br>2.0 | 85<br>93<br>89 | 1 |
| | | | | | | Average 1961 | | 2.70 | | 0.7 | | | | 0.5 | | Satis. |
| | Chas. D. Warner & Son, Inc. 1027 Yosemite Blvd. Modesto SE¼ Sec. 32, T. 3 S., R. 11 E., MDBM. About 1⅓ miles southwest of Waterford. | Excavate from stream bed, with dragline and slackline cableway, to 30′ depth. Bottom on cemented gravel layer. Abundant plus 1″ gravel, 4″ maximum. | Crush oversize in primary jaw and secondary cone crushers Wash over standard vibrating screens; 2 sand rake | 30 cubic yards per hour | Concrete sand and gravel, road base | | | | | | | | | | | |
| | Center Sec. 3, T. 4 S., R. 10 E., MDBM. About 5 miles west of Waterford. | Excavate with dragline from stream bed, to depths of 50-70′. Several clay layers present. Maximum size 3″. | Crush oversize in gyratory crusher. Wash over standard vibrating screens, sand drag. | 25 tons per hour | Concrete sand and gravel | | | | | | | | | | | |
| | The Graystone Block Co., Inc., removes sand from a pit in the Tuolumne River for use in manufacture of concrete block. Operate a small screening plant on the river near the Highway 99 crossing. | | | | | | | | | | | | | | | |
| | Standard Materials, operates a portable, dry, crushing and screening plant in the NW¼ Sec. 1, T. 4 S., R. 10 E., MDBM., to produce bituminous aggregate for hot plant on premises. Excavate to about 70′ depth from stream bed with slackline cableway. Pit is adjacent to American Sand and Gravel Co's. pit. | | | | | | | | | | | | | | | |

| DEPOSITS | | | | UTILIZATION | | | | | | | | | | | | | | | |
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| | | | | Fixed Plant Operations | | | | | Laboratory Test Data | | | | | | | | | | |
| | | | | | | | | | | Specific Gravity | | Absorption (percent) | | Abrasion (percent loss) | | Soundness (percent loss) | | | |
| Name and Location | Type and Extent | General Features | Rock Types (percent) | Name, Location of Operator | Pit Data | Processing Data | Reported Capacity | Products | | Sand | Gravel | Sand | Gravel | 100 rev. | 500 rev. | Sand | Gravel | Sand Equiv. | Organic Content |
| **Tuolumne River,** Tuolumne County, near Jacksonville | Dredge tailings and reworked tailings occur in the stream bed from Jacksonville to confluence with Moccasin Ck.; a distance of about 2 miles. Deposit ranges from 50-300′ in width, and is at least 10′ deep. | Little or no overburden, slight replenishment. Tailings contain high proportion of cobbles 2-3′ in diameter. Average maximum size 8″. Stream-reworked tailings contain gravel up to 6″ maximum. Sand occurs in the adjacent flood plain at Jacksonville. Sub-rounded gravel. | Quartzitic meta-sedimentary 38<br>Slate ... 18<br>Greenstone 11<br>Schist ... 8<br>Vein quartz 5<br>Diorite-gabbro 5<br>Serpentine 5<br>Greenschist 3<br>Tertiary volcanic .. 3<br>Amphibolite 2<br>Hornfels .. 2 | George and Wendell G. Reed<br>529 Covena Ave.<br>Modesto<br>NE¼ Sec. 19, T.1S., R.15E., MDBM.<br>About 1 mile east of Jacksonville. Sand pit in SE¼ Sec. 18, south of Jacksonville. Plant located in SW¼ Sec. 12, T.1N., R.14E., MDBM. | Excavate with dragline in floodplain and tailings, to depths of about 10′. Haul by truck About 2 miles to plant. | Semi-permanent plant. Crush oversize in portable crushing equipment: primary jaw and secondary roll crushers. Screen (dry) over standard vibrating screens. | Approx. 100 tons per hour. | Bituminous sand and gravel, road base | | | | | | | | | | | |
| **Tuolumne River,** Stanislaus County, near La Grange | Dredge tailings occur along the Tuolumne River between Waterford and La Grange for a distance of about 9 miles. Tailings range from ¼ to ½ mile in thickness and are at least 30′ thick. | No overburden, maximum size 8″. Sub-rounded gravel. | Lithology similar to that of stream bed deposit. | None. | | | | | | | | | | | | | | | |
| **Upper Truckee River** (and tributary **Angora Creek),** El Dorado County, near Meyers | Stream bed deposit extends for about a mile north of intersection of Upper Truckee River with Hway 50; about 1000′ wide, at least 15′ deep. | Little to no overburden, no replenishment. Maximum size 3″. Sub-rounded gravel. | Predominantly granitic rock types | Harms Bros.<br>5261 Stockton Blvd.<br>Sacramento<br>SW¼ Sec. 30, T.12N., R.18E., MDBM.<br>About 1 mile west of Meyers. | Excavate from stream bed to water table (about 15′) with scraper pulled by tractor. Haul about 500′ to plant. | Portable crushing plant, no washing. | Estimate 200 tons per hour | Bituminous sand and gravel | | | | | | | | | | | |
| | | | | La Grange Const. Co., Inc.<br>P.O. Box 1487<br>Reno, Nevada<br>NE¼ Sec. 18, T.12N., R.18E., MDBM.<br>About 2½ miles south of Tahoe Valley. | Excavate with shovel from pit 400′ x 1500′ x 30′ deep in Angora Ck., tributary to the Upper Truckee River. Haul short distance to plant. About 6′ of overburden. Some houlders present, excess of sand. | Portable plant. | Estimate 150 tons per hour | Bituminous sand and gravel, road base | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Uvas (Carnadero) Creek,** Santa Clara County, near Gilroy | Stream bed deposit extends for about 3 miles to the west of Gilroy. Width varies from 500-1,000′. Shallow deposit, at least 10′ deep. | Slight amount of overburden; 1-2′ silt in floodplain, none in stream bed. Little replenishment. Maximum size gravel 6″; average size 2″. Subangular to subrounded gravel. | Sandstone 69<br>Metavolcanic 20<br>Serpentine 5<br>Chert 2<br>Shale 2<br>Siltstone 1<br>Granitic 1 | Brem's Gravel and Sand<br>211 Princevalle St.<br>Gilroy<br>SE ¼ Sec. 1, T. 11 S., R. 3 E., MDBM.<br>About ½ mile west of Gilroy. | Excavate from stream bed with front end shovel loader, to about 8′ depth. Haul about ¾ mile in end dump truck. | Simple screening plant: standard vibrating screens, sand screw. | 400 tons per 8 hours | Concrete sand and gravel, drain gravel | | | | | | | | | | | | | |
| | | | | Howson's Inc.<br>738 N. Monterey St.<br>Gilroy<br>NE ¾ Sec. 2 (proj.), T. 11 S., R. 3 E., MDBM.<br>About 1 mile west of Gilroy. | Excavate with shovel loader to depths of 8′. Haul short distance to plant. Dry pit. | Primary jaw, secondary roll crushers; wash in trommel screen, over standard vibrating screens; and 4 sand screws. (Idle in 1961) | About 350 tons per hour | Concrete and bituminous sand and gravel | | | | | | | | | | | | | |
| | | | | Western Tile and Supply Co.<br>P.O. Box 104<br>Gilroy<br>NE ¼ Sec. 2 (proj.), T. 11 S., R. 3 E., MDBM.<br>About 1½ miles west of Gilroy. | Excavate with front end shovel loader to 4′ depth. Haul by truck several hundred feet to plant. | Wash over standard vibrating screens; crush plus 1½″ gravel in jaw crusher. Process sand in screw. | 100 tons per hour | Concrete sand and gravel | No. of tests | 2 | 4 | 2 | 4 | 2 | 2 | 2 | 4 | 2 | 2 |
| | | | | | | | | | Range of results | 2.58<br>2.59 | 2.59<br>to<br>2.65 | 3.0<br>3.5 | 2.0<br>to<br>2.3 | 6.6<br>7.2 | 28.6<br>29.2 | 14.5<br>12.5 | 5.7<br>to<br>13.0 | 77<br>90 | 1<br>2 |
| | | | | | | | | | Average 1957 | | 2.61 | | 2.2 | | | | 9.3 | | Satis. |
| **Warthan Creek,** Fresno County, approx. 5 miles southwest of Coalinga | Stream bed deposit extends for about 2 miles upstream from mouth of canyon where stream flows thru Tulare Formation; narrow, about 50-100′ wide, shallow deposit | Slight replenishment. No overburden. Maximum size 4″. | Similar to Los Gatos Creek, reworked Tulare Formation. | None | | | | | | | | | | | | | | | | | |
| **Wolfskill Formation,** Solano County, near Fairfield | Lenticular, conglomeratic beds occur in the Pliocene Wolfskill Formation which crops out in Contra Costa and Solano Counties. Gravelly beds are up to 20′ thick and several hundred feet long. Commercially-developed area covers about 0.1 square mile. | Overburden ranges from 0-30′. Maximum size gravel 6″. Rounded gravel. | Predominantly andesite, rhyolite and quartzite. | Petersen Pit in SW ¼ Sec. 30, T. 5 N., R. 1 E., MDBM., is intermittently operated.<br><br>Teichert Aggregates operated a pit in NE ¼, Sec. 11, T. 4 N., R. 1 W., MDBM., to produce road base for State Route 12. | | | | | | | | | | | | | | | | | |
| **Zapato Creek,** Fresno County, approx. 12 miles southeast of Coalinga | Stream bed deposit extends for several miles upstream from intersection Highway 33; average width 500′, over 30′ deep. | Little replenishment in flood stages; overburden ranges from 1 to 4′ of silty sand; average maximum size 6″. Some larger boulders up to 2′ present. Subangular to subrounded gravel. | Sandstone 66<br>Limestone 24<br>Greenstone 3<br>Shale 2<br>Siltstone-calcareous 2<br>Vein quartz 1<br>Chert <1<br>Serpentine <1<br>Gypsite <1<br>Dacite <1 | The Thompson Materials and Construction Co. formerly excavated from pits in Secs. 17 and 24, T. 21 S., R. 16 E., MDBM. Plant abandoned since 1959. | | | | | No. of tests | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 2 |
| | | | | | | | | | Range of results | 2.58<br>2.58<br>2.59 | 2.61<br>2.65 | 1.7<br>2.4<br>2.6 | 1.4<br>2.0 | 4.0<br>5.6 | 22.0<br>25.2 | 7.6<br>15.5<br>16.2 | 4.4<br>9.5 | 74<br>82 | 1+<br>1 |
| | | | | | | | | | Average | | | | | | | | | | Satis |

## LIST OF PRODUCERS IN CENTRAL CALIFORNIA—1961

| Operator | Address | Location |
|---|---|---|
| *Alameda County* | | |
| *Bell's Sand and Gravel Co. | P. O. Box 1487, Irvington | Irvington |
| *California Rock & Gravel Co. | 582 Market St., San Francisco | Pleasanton |
| *Concrete Service Co. | 860 Sunol St., San Jose | Sunol |
| *Deetz Sand & Gravel Co. | 4227 Pleasanton Ave., Pleasanton | Pleasanton |
| *Henry J. Kaiser Co. | 300 Lakeside Dr., Oakland | Pleasanton, Niles |
| *Niles Sand & Gravel Co., Inc. | P. O. Box 2248, Fremont | Niles |
| *Pacific Cement & Aggregates, Inc. | 400 Alabama St., San Francisco | Pleasanton, Niles |
| *Rhodes & Jamieson, Ltd. | 333-23rd Ave., Oakland | Pleasanton, Niles |
| H. C. Thomsen Sand Dredging Inc. | P. O. Box 403, Alameda | Rio Vista |
| *Alpine County* | | |
| I. L. Croft | P. O. Box 428, Saugus | Hope Valley |
| Nevada Contractors | Mundin, Nevada | — |
| *Nevada Lumber Co. | Tahoe Valley, Calif | Hope Valley |
| *Amador County* | | |
| Harley H. Kreth | Buena Vista Road, Ione | Buena Vista, Lancha Plana |
| *Calaveras County* | | |
| *Neilsen's Gravel Plant | P. O. Box 457, San Andreas | San Andreas |
| Claude C. Wood | P. O. Box 599, Lodi | Camanche |
| *Contra Costa County* | | |
| Moe Sand Co. | 4501 Tidewater Ave., Oakland | Rio Vista |
| *Morris Sand Pit | Rte. 1, Box 661, Antioch | Antioch |
| *Silver Sand Co. | P. O. Box 5, Cowell | Cowell |
| *El Dorado County* | | |
| I. L. Croft & Son | P. O. Box 428, Saugus | — |
| *Harms Bros. | 5261 Stockton Blvd., Sacramento | Meyers |
| *Cris Henningsen & Sons | 1650 Highway 50, Placerville | Placerville |
| *La Grange Const. Co., Inc. | P. O. Box 1487, Reno, Nevada | Tahoe Village |
| *Fresno County* | | |
| *Anderson Rock Products | 11000 N. Lanes Road, Fresno | Fresno |
| *Central Rock & Sand Co. | P. O. Box 425, Sanger | Sanger |
| *L. D. Folsom, Inc. | P. O. Box 347, Coalinga | Coalinga |
| *Industrial Asphalt Inc. | 3143 So. Hwy. 99, Fresno | Sanger |
| *Pacific Cement & Aggregates, Inc. | 400 Alabama St., San Francisco 10 | Rockfield |
| Pinedale Rock & Sand Pit | P. O. Box 705, Pinedale | Pinedale |
| *River Rock Products | P. O. Box 1319, Fresno | Fresno |
| *Sanger Rock & Sand | 17125 E. Kings Canyon Road, Sanger | Sanger |
| *San Joaquin Rock Co. | 11599 Friant Road, Fresno | Fresno |
| *Stewart & Nuss, Inc. | 410 Thorne Ave., Fresno | Fresno |
| Thomas Construction Co. | P. O. Box 683, Fresno | Fresno |
| *Volpa Bros. | 10463 Northrice Road, Fresno 25 | Friant |
| *Inyo County* | | |
| Baun Construction Co., Inc. | 3329 W. Dudley Ave., Fresno | Bishop |
| *Bishop Engineering & Constr. Inc. | P. O. Box 505, Bishop | Bishop |
| *Hiatt's Sand & Gravel Co. | 362 E. Clarke St., Bishop | Bishop |
| *Lone Pine Sand & Gravel Co. | P. O. Box 363, Lone Pine | Lone Pine |
| *Madera County* | | |
| *Cerutti & Thompson Transportation Co. | 5110 Rd. 26 3/4, Madera | Skaggs Bridge |
| *Industrial Asphalt Inc. | 3143 So. Hwy. 99, Fresno | Pinedale |
| San Joaquin Valley Pipe Co. | P. O. Box 215, Hwy. 99 N., Chowchilla | Chowchilla |
| *Marin County* | | |
| *Black Point Aggregates | c/o Niles Sand & Gravel, P. O. Box 2248, Fremont | Black Point |
| L. A. Forde Co. | Box 306, San Anselmo | Nicasio |
| *Joslin Brothers | Point Reyes Sta. | Point Reyes Sta. |
| United Sand & Gravel Co. | c/o A. G. Schoonmaker Co., Foot of Spring Sausalito | Sausalito |
| *Mariposa County* | | |
| Harms Bros. | 5261 Stockton Blvd., Sacramento 17 | El Portal |
| *Kenneth Henley | Groveland | Groveland |
| *Mariposa Sand & Gravel Co. | P. O. Box N, Mariposa | Mariposa, El Portal |

LIST OF PRODUCERS IN CENTRAL CALIFORNIA—1961—Continued

| *Operator* | *Address* | *Location* |
|---|---|---|
| *Merced County* | | |
| *Cressey Sand & Gravel Plant | Rt. 2, Box 360, Merced | Cressey |
| A. L. Kelley Sand & Gravel | 11th & J St., Merced | Merced |
| *Le Grand Sand & Gravel | P. O. Box 232, Le Grand | Le Grand |
| *Los Banos Mining Co. | P. O. Box 1111, Los Banos | Los Banos |
| *River Rock, Inc. | 20 E. 15th St., Merced | Snelling, Cressey |
| William Stockton | Los Banos | Los Banos |
| *Turlock Rock Co., Inc. | P. O. Box 449, Turlock | Cressey |
| *Valley Aggregate, Inc. | 625 J Street, Merced | Cressey |
| *Mono County* | | |
| Frazzini Carson Genl. Contr. | Hwy. 395N, Reno, Nevada | -- |
| *Monterey County* | | |
| Stanton Biggs | 2825 N. Weber, Fresno | — |
| *Del Monte Properties Co. | P. O. Box 150, Pacific Grove | Pacific Grove |
| *Granite Construction Co. | P. O. Box 900, Watsonville | Seaside, Carmel Valley |
| Jesse Harrison | P. O. Box 315, San Ardo | — |
| *Monterey Sand Co. | P. O. Box 928, Monterey | Marina, Sand City |
| *Pacific Cement & Aggregates, Inc. | 400 Alabama St., San Francisco 10 | Lapis, Pratteo |
| *Seaside Sand & Gravel Co., Inc. | 3367 Drew St., Marina | Marina |
| *South Counties Sand & Gravel | Metz Road, King City | King City |
| *Valley Rock & Adobe Co. | P. O. Box 64, Carmel Valley | Carmel Valley |
| *Napa County* | | |
| Benson Gravel Plant | P.O. Box 341, Angwin | Angwin |
| N. D. Ellsworth & Sons | 1090 Summit, Napa | Napa |
| Huntington Bros. | Box 446, Napa, Calif. | Napa |
| *McGill Rock & Sand Co. | 933 Main St., St. Helena | Rutherford |
| *Harold Smith & Son Contr. | P.O. Box 232, St. Helena | St. Helena |
| *Nevada County* | | |
| *Clements Rock Products, Inc. | P.O. Box 667, Fremont | Truckee |
| *A. O. & K. M. Hansen | Rte. 1, Box 472-L, Grass Valley | Grass Valley |
| Isbell Const. Co. | P.O. Box 2351, Reno, Nevada | — |
| *Placer County* | | |
| *Bear River Sand & Gravel, Inc. | P.O. Box 606, Colfax | Colfax |
| *Joe Chevreaux | P.O. Box 65, Station A, Auburn | Colfax |
| Madonna Const. Co. | P.O. Box 910, San Luis Obispo | — |
| *R. J. Miles Co. | P.O. Box 458, Colfax | Colfax |
| B. C. Richter | 1955 Mitchel Ave., Oroville | — |
| *Teichert Aggregates | P.O. Box 928, Sacramento | Tahoe Pines |
| *Sacramento County* | | |
| *Arden Sand & Gravel Co. | 977 Arden Way, Sacramento | Sacramento |
| *Brighton Sand & Gravel Co. | P.O. Box 7001, Perkins Branch, Sacramento | Perkins |
| *Fair Oaks Gravel Co. | 4000 Illinois Ave., Fair Oaks | Fair Oaks |
| *Granite Construction Co. | P.O. Box 900, Watsonville | Sacramento |
| Harms Bros. | 5261 Stockton Blvd., Sacramento | — |
| *Hard Materials | P.O. Box 709, Sacramento | Sacramento |
| *McGillivray Construction Co. | P.O. Box 873, Sacramento 4 | Sacramento |
| *Pacific Cement & Aggregates Inc. | 400 Alabama St., San Francisco | Fair Oaks |
| *Robert Powell Products, Inc. | 24th & American River, Sacramento | Sacramento |
| Robertson Sand & Gravel Co. | 1051 Vine St., Sacramento | Sacramento |
| *Teichert Aggregates | P.O. Box 928, Sacramento | Perkins, No. Sacramento |
| *San Benito County* | | |
| *Hollister Sand & Gravel Co. | P.O. Box 180, Hollister | Hollister |
| Madonna Const. Co. | P.O. Box 910, San Luis Obispo | — |
| *Don L. Rider | Cienega Road, Hollister | Hollister |
| *San Francisco County* | | |
| Clementina Ltd. | 2277 Jerrold Ave., San Francisco | — |
| A. Malerbi Sand Co. | 273 Holyoke St., San Francisco 24 | San Francisco |
| Moe Sand Co. | 639 Embarcadero, Oakland | S.F. Bay |

LIST OF PRODUCERS IN CENTRAL CALIFORNIA—1961—Continued

| Operator | Address | Location |
|---|---|---|
| *San Joaquin County* | | |
| *Calaveras Rock Co. | 22 N. San Joaquin, Stockton | Linden |
| *Munn & Perkins | P.O. Box 1092, Modesto | Escalon |
| *Pacific Cement & Aggregates, Inc. | 400 Alabama St., San Francisco 10 | Tracy |
| *Stanfield & Moody Sand & Gravel Co. | P.O. Box 352, Tracy | Carbona |
| *Teichert Aggregates | P.O. Box 928, Sacramento | Tracy |
| *Claude C. Wood Co. | P.O. Box 599, Lodi | Clements |
| *San Mateo County* | | |
| Pacific Cement & Aggregates, Inc. | 400 Alabama St., San Francisco 10 | Pilarcitos Ck. |
| *Santa Clara County* | | |
| *Atlas Materials Co. | N. Monterey Madrone, San Jose | Morgan Hill |
| *Brem's Gravel & Sand | 211 Princevalle St., Gilroy | Gilroy |
| Louis Canha | Catherine & Gold, Alviso | San Jose |
| Cupertino Gravel Co. | 605 W. Bayshore, Sunnyvale | Stevens Ck. |
| *Leo F. Piazza Paving Co. | 985 Downer Ave., San Jose 26 | San Jose |
| A. J. Raisch Paving Co. | 900 W. San Carlos St., San Jose 26 | San Jose |
| *Reed & Graham Inc. | 690 Sunol St., San Jose 26 | Campbell |
| *Santa Clara Sand & Gravel Co. | P.O. Box 638, Santa Clara | Coyote Creek, Stevens Ck. Rd. |
| *L. C. Smith Co. | 465 Concar Drive, San Mateo | San Jose |
| Terra Commercial Co. | 375 Umbarger Road, San Jose | — |
| David Tonelli | 10150 Clayton Rd., San Jose | Coyote |
| *A. F. Voss | 10445 S. Stevens Creek Rd., Cupertino | Stevens Creek |
| *Western Tile & Supply Co. | P.O. Box 104, Gilroy | Gilroy |
| *Santa Cruz County* | | |
| *Central Supply Co. | P.O. Box 151, Watsonville | Felton |
| *Concrete Service Co. | 860 Sunol St., San Jose | Scotts Valley |
| *Graham & Son | 500 Mt. Herman Road, Santa Cruz | Felton |
| *Henry J. Kaiser Co. | 300 Lakeside Dr., Oakland 12 | Felton |
| *Pacific Cement & Aggregates, Inc. | 400 Alabama St., San Francisco 10 | Felton |
| *Santa Cruz Aggregates Co. | 303 Coral St., Santa Cruz | Felton |
| *Solano County* | | |
| Allison Land Co. | Vacaville | Vacaville |
| *Frederickson Bros. | 1259 65th St., Emeryville | Winters |
| *Madison Sand & Gravel Co. | P.O. Box 66, Madison | Winters |
| Parish Bros., Inc. | P.O. Box 6, Benicia | Denverton |
| Vallejo Bldg. Materials Co. | 909 Sonoma Blvd., Vallejo | — |
| *Sonoma County* | | |
| *Basalt Rock Co., Inc. | P.O. Box 540, Napa | Healdsburg |
| *Cloverdale Ready Mix | P.O. Box 451 First St., Cloverdale | Cloverdale |
| *Hein Bros. Basalt Rock Co. | P.O. Box 162, Petaluma | West Windsor |
| *Marshall Maxwell Inc. | 1330 King St., Santa Rosa | Mirabel |
| Roads Inc. | P.O. Box 2385, Santa Rosa | — |
| Franklin W. Serres | 16060 Sonoma Hwy. Sonoma | Aqua Caliente |
| *Harvey Taylor Gravel Co. | 523 Mason St., Healdsburg | Healdsburg |
| *Trudell Rock Co. | 700 West Side Road, Healdsburg | Healdsburg |
| *Windsor Sand & Gravel | P.O. Box 145, Windsor | Windsor |
| *Stanislaus County* | | |
| *American Sand & Gravel Co., Inc. | 2402 McHenry Ave., Modesto | Waterford |
| *Graystone Block Co., Inc. | 316 River Rd., Modesto | Modesto |
| *Hughson Gravel Plant | P.O. Box 35, Hughson | Waterford |
| *Frank B. Marks, Jr. | P.O. Box 668, Newman | Newman |
| *Modesto Sand & Gravel Co. | Conant Ave., Modesto | Salida |
| *Putnam Sand & Gravel Co., Inc. | 200 Santa Rosa Ave., Modesto | Waterford |
| *George & Wendell G. Reed | 529 Covena Ave., Modesto | Waterford |
| *Santa Fe Rock & Sand | P.O. Box 3042, Modesto | Waterford |
| *Standard Rock Co. | P.O. Box 696, Escalon | Oakdale, Knights Ferry |
| H. Sykes | P.O. Box 998, Patterson | Patterson |
| *Chas. D. Warner & Son, Inc. | 1027 Yosemite Blvd., Modesto | Waterford |
| *Tulare County* | | |
| *Pacific Cement & Aggregates, Inc. | 400 Alabama St., San Francisco 10 | Lemon Cove |
| *E. F. Quiram & Sons | 406 Garden St., Porterville | Porterville |
| *Sequoia Rock Co. | P.O. Box 217, Sta. A, Bakersfield | Porterville |
| *Visalia Sand Plant | P.O. Box 701, Visalia | Visalia |

LIST OF PRODUCERS IN CENTRAL CALIFORNIA—1961—Continued

| *Operator* | *Address* | *Location* |
|---|---|---|
| *Tuolumne County* | | |
| Independent Const. | 741 50th Ave., Oakland | — |
| *Geo. Reed Co. | 529 Covena Ave., Modesto | Jacksonville |
| *Yolo County* | | |
| Gordon H. Ball | 300 Camille Ave., Danville | — |
| *Granite Construction Co. | P.O. Box 900, Watsonville | Yolo |
| *Madison Sand & Gravel Co. | P.O. Box 66, Madison | Madison |
| *Pacific Cement & Aggregates Inc. | 400 Alabama St., San Francisco 10 | Yolo |
| *Schwarzgruber & Sons | 28 W. Main St., Woodland | Yolo |
| *Teichert Aggregates | P.O. Box 928, Sacramento 4 | Yolo |

* Discussed in report. Other producers are either government contractors who operate portable plants, or pit operators without fixed processing equipment.

## CROSS-INDEX TO OPERATORS

| Name of Operator | Deposit |
|---|---|
| American Sand and Gravel Co., Inc. | Tuolumne River |
| Anderson Rock Products | San Joaquin River |
| Arden Sand and Gravel Co | American River |
| Atlas Materials Co. | Coyote Creek |
| Basalt Rock Co., Inc. | Russian River |
| Bear River Sand and Gravel, Inc. | Bear River |
| Bell's Sand and Gravel Co. | Irvington Gravel |
| Bishop Engineering and Construction, Inc. | Owens River |
| Black Point Aggregates | Novato Conglomerate |
| Brem's Gravel and Sand | Uvas Creek |
| Brighton Sand and Gravel Co. | American River |
| Calaveras Rock Co. | Calaveras River |
| California Rock and Gravel Co. | Arroyo Del Valle |
| Central Rock and Sand Co. | Kings River |
| Central Supply Co. | Santa Margarita Formation |
| Cerutti and Thompson Transportation Co. | San Joaquin River |
| Joe Chevreaux | Bear River |
| Clements Rock Products Inc. | Donner Lake Deposit |
| Cloverdale Ready Mix | Russian River |
| Concrete Service Co. | Calaveras Creek |
| Coyote Sand and Gravel Inc. | Coyote Creek |
| Cressey Sand and Gravel Plant | Merced River |
| Deetz Sand and Gravel Co. | Arroyo Del Valle |
| Del Monte Properties Co. | Monterey Peninsula dune sand |
| Empire Rock Co., Inc. | Santa Rosa Creek |
| Fair Oaks Gravel Co. | American River |
| L. D. Folsom, Inc. | Los Gatos Creek |
| Frederickson Bros. | Putah Creek |
| Graham and Son | Santa Margarita Formation |
| Granite Construction Co. | American River |
| Granite Construction Co. | Cache Creek |
| Granite Construction Co. | Los Banos Creek |
| Granite Construction Co. | Monterey Bay beach and dune sand |
| Granite Construction Co. | Panoche Creek |
| Graystone Block Co., Inc. | Tuolumne River |
| A. O. and K. M. Hansen | Bear River |
| Hard Materials | American River |
| Harms Bros. | Upper Truckee River |
| Hein Bros. Basalt Rock Co. | Russian River |
| Kenneth Henley | Moore Creek |
| Chris Henningsen & Sons | American River |
| Hiatt's Sand and Gravel Co. | Owens River |
| C. B. Hines | San Joaquin River |
| Hollister Sand and Gravel Co. | San Benito River |
| Howson's Inc. | Uvas Creek |
| Hughson Gravel Plant | Tuolumne River |
| Industrial Asphalt Inc. | Kings River |
| Industrial Asphalt Inc. | San Joaquin River |
| Joslin Bros. | Lagunitas Creek |
| Henry J. Kaiser Co. | Alameda Creek |
| Henry J. Kaiser Co. | Arroyo Del Valle |
| Henry J. Kaiser Co. | Santa Margarita Formation |
| La Grange Construction Co. | Upper Truckee River |
| Le Grand Sand and Gravel | Le Grand |
| Lone Pine Sand and Gravel Co. | Lone Pine Creek |
| Los Banos Mining Co. | Los Banos Creek |
| Madison Sand and Gravel Co. | Cache Creek |
| Madison Sand and Gravel Co. | Putah Creek |
| Mariposa Sand and Gravel Co. | Merced River |
| Frank B. Marks, Jr. | Orestimba Creek |
| Marshall Maxwell, Inc. | Russian River |
| McGill Rock and Sand Co. | Conn Creek |
| McGillvray Construction Co. | American River |
| R. J. Miles | Bear River |
| Miller Bros. | San Joaquin River |
| Mirabel Sand and Gravel | Russian River |
| Modesto Sand and Gravel Co. | Stanislaus River |
| Monterey Sand Co. | Monterey Bay beach and dune sand |
| Morris Sand Pit | Antioch sand |
| Munn and Perkins | Stanislaus River |
| Neilsen's Gravel Plant | Chili Gulch Deposit |
| Nevada Lumber Co. | Carson River |
| Niles Sand and Gravel Co., Inc. | Alameda Creek |
| Pacific Cement and Aggregates, Inc. | Alameda Creek |
| Pacific Cement and Aggregates, Inc. | American River |
| Pacific Cement and Aggregates, Inc. | Arroyo Del Valle |
| Pacific Cement and Aggregates, Inc. | Corral Hollow Creek |
| Pacific Cement and Aggregates, Inc. | Cache Creek |
| Pacific Cement and Aggregates, Inc. | Kaweah River |
| Pacific Cement and Aggregates, Inc. | Monterey Bay beach and dune sand |
| Pacific Cement and Aggregates, Inc. | San Joaquin River |
| Pacific Cement and Aggregates, Inc. | Santa Margarita Formation |
| Leo F. Piazza Paving Co. | Guadalupe Creek |
| Robert Powell Products, Inc. | American River |
| Putnam Sand and Gravel Co., Inc. | Tuolumne River |
| E. F. Quiram and Sons | Tule River |
| George and Wendell G. Reed | Tuolumne River |
| Reed and Graham Inc. | Los Gatos Creek |
| Rhodes and Jamieson, Ltd. | Alameda Creek |
| Rhodes and Jamieson, Ltd. | Arroyo Del Valle |
| Don L. Rider | San Benito River |
| River Rock, Inc. | Merced River |
| River Rock Products | San Joaquin River |
| Sanger Rock and Sand | Kings River |
| San Joaquin Rock Co. | San Joaquin River |
| Santa Clara Sand and Gravel Co. | Calaveras Creek |
| Santa Clara Sand and Gravel Co. | Coyote Creek |
| Santa Clara Sand and Gravel Co. | Santa Clara Formation |
| Santa Cruz Aggregates Co. | Santa Margarita Formation |
| Santa Fe Rock and Sand | Tuolumne River |
| Schwarzgruber and Sons | Cache Creek |
| Seaside Sand and Gravel Co., Inc. | Monterey Bay beach and dune sand |
| Sequoia Rock Co. | Tule River |
| Silver Sand Co. | Domengine Formation |
| Harold Smith and Son Contr. | Sulphur Creek |
| L. C. Smith Co. | Guadalupe Creek |
| South Counties Sand and Gravel Co. | Chalone Creek |
| Standard Materials | Tuolumne River |
| Standard Rock Co. | Stanislaus River |
| Stanfield and Moody Sand and Gravel Co. | Corral Hollow Creek |
| Stewart and Nuss, Inc. | San Joaquin River |
| Harvey Taylor Gravel Co. | Dry Creek |
| Teichert Aggregates | American River |
| Teichert Aggregates | Blackwood Creek |
| Teichert Aggregates | Cache Creek |
| Teichert Aggregates | Calaveras River |
| Teichert Aggregates | Corral Hollow Creek |
| Teichert Aggregates | Mokelumne River |
| Trudell Rock Co. | Dry Creek |
| Turlock Rock Co. | Merced River |
| Valley Aggregates, Inc. | Merced River |
| Valley Rock and Adobe Co. | Carmel River |
| Visalia Sand Plant | Kaweah River |
| Volpa Bros. | San Joaquin River |
| A. F. Voss | Santa Clara Formation |
| Chas. D. Warner and Son, Inc. | Tuolumne River |
| Western Tile and Supply Co. | Uvas Creek |
| Windsor Sand and Gravel | Russian River |
| Claude C. Wood Co. | Mokelumne River |

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DIVISION OF MINES AND GEOLOGY
IAN CAMPBELL, STATE GEOLDGIST

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF CONSERVATIO

C3
A3
no.180B
plate 1



# MAP SHOWING SAND AND GRAVEL DEPOSITS AND PLANTS IN CENTRAL CALIFORNIA

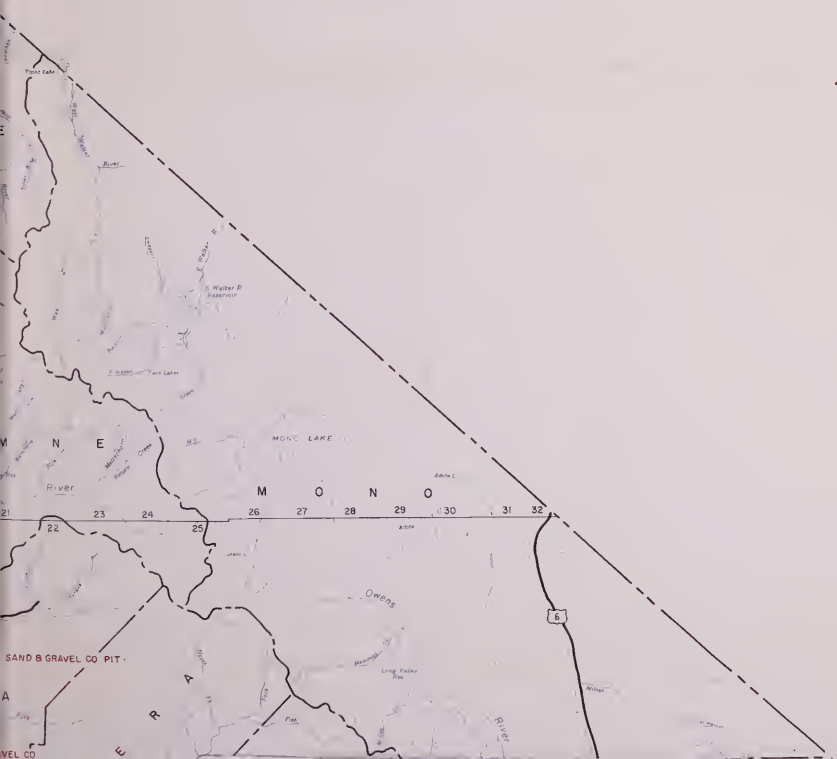
EXPLANATION

- Sand and gravel plant
- Gravel pit
- Sand and gravel deposits, or tailings where noted (Width not to scale)

0 10 20 30 40 50

Scale in miles

COMPILED BY H. GOLDMAN
1962



SAN MATEO
SANTA CRUZ
SANTA CLARA
STANISLAUS
MERCED
MARIPOSA
MADERA
FRESNO
SAN BENITO
MONTEREY
KINGS
OCEAN
APPALACHES
PACIFIC CEMENT & AGGREGATES, INC
HENRY J. KAISER CO
NILES SAND & GRAVEL CO, INC
RHODES & JAMIESON, LTD
PACIFIC CEMENT & AGGREGATES, INC
Sunol
CONCRETE SERVICE CO
SANTA CLARA SAND & GRAVEL CO
BELLS PIT
H SAND PIT
Irvington Gravel
Pleasanton
Livermore
Niles
Irvington
Palo Alto
SANTA CLARA SAND & GRAVEL CO.
A.F. VOSS
L.C. SMITH CO.
Santa Clara Fm.
Campbell
REED & GRAHAM, INC. PIT
Los Gatos
LEO F. PIAZZA PAVING CO.
Cupertino
San Jose
COYOTE SAND & GRAVEL, INC.
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COYOTE SAND & GRAVEL, INC. PIT
ATLAS MATERIALS CO.
Santa Margarita Fm.
CENTRAL SUPPLY CO.
PACIFIC CEMENT & AGGREGATES, INC
SANTA CRUZ AGGREGATES CO
GRAHAM & SON
Felton
Scotts Valley
HENRY J. KAISER CO.
WESTERN TILE & SUPPLY CO.
BREM'S GRAVEL & SAND
Santa Cruz
HOWSON'S INC
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Hollister
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Salinas
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DEL MONTE PROPERTIES CO.
Seaside
Monterey
DEL MONTE PROPERTIES CO. PIT
Monterey Peninsula Dune Sand
Carmel
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Modesto
HUGHSON GRAVEL
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Empire
Waterford
GEORGE & WENDELL G. REED (Tailings)
LaGrange
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TURLOCK ROCK CO
VALLEY AGGREGATES, INC
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Cressey
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FRANK B. MARKS, JR
Newman
Gustine
Merced
MERCED COUNTY PIT (Tailings)
Planada
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Le Grand
Los Banos
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FREEMAN PIT
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GRANITE CONSTRUCTION CO. PIT
DIVISION OF HIGHWAYS PIT
Metz
SOUTH COUNTIES SAND & GRAVEL CO.
ZABALA PIT
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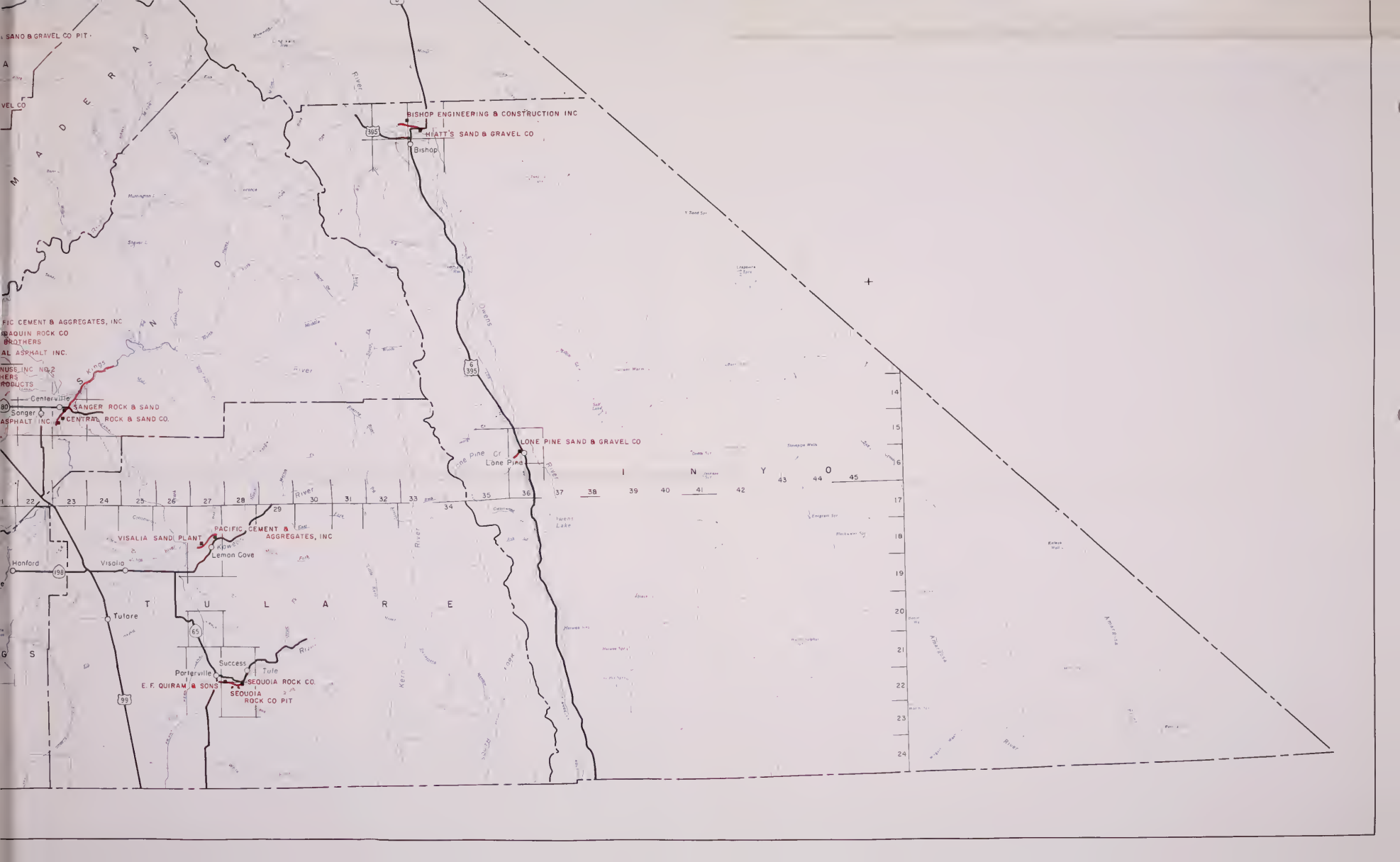
Big Sur
Jolon
Bradley
Lemoore
Hanford
L.D. FOLSOM, INC
Coalinga
DIVISION OF HIGHWAYS PIT
THOMPSON PIT
Tulare Lake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Lone Pine Cr
INYO
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Lemon Cove
Hanford
198
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TULARE
Tulare
65
Success
Porterville
Tule
E. F. QUIRAM & SONS
SEQUOIA ROCK CO.
SEQUOIA ROCK CO PIT
99
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Owens
Lake
Diamond Mt.
Antelope
Valley
Mountain
Meadow
Creek
Canyon
Spring
Ridge
Flat
Basin
Hill
Peak
Lake
Dry
Wash
Gulch
Valley
Forest
Desert
Rock
Sand
Gravel
Pit
Quarry
Plant
Mine
Road
Highway
Railroad
Bridge
Dam
Tunnel
Camp
Ranch
Station
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Church
School
Cemetery
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Park
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Recreation
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Bolt
Anchor
Shotcrete
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